BART Bicycle Plan
Modeling Access to Transit

[Adoption date]

Funded with a grant from the Caltrans Statewide Transit Planning Studies program

Eisen | Letunic
in association with Fehr & Peers and Nelson\Nygaard

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Executive Summary

Plan Goal

Like similar transit systems in Japan and Western Europe, BART can retool its stations and approach to access planning to attract more bicycles and fewer cars to the system each day. Bicycling to BART, particularly when those trips replace automobile access, helps avoid construction of costly auto parking spaces, can increase ridership, reinforce the agency's image as a green transportation provider, promote fitness and public health, and contribute to achieving regional goals to reduce traffic congestion and greenhouse gas emissions. Providing plentiful and convenient bike parking is also the most effective tool BART has to convince as many passengers as possible to leave their bicycles at the station, rather than bringing them onboard, thus leaving space for the system to carry more passengers.

> *The goal of this plan is to double BART bicycle access, to 8% of all trips, by 2022.*

When this plan was published in 2012, approximately 4% of home-based trips, or about 14,000, were made to and from BART stations each weekday by bicycle. Building on the success of past BART bicycle access improvements, the growth in popularity of bicycle travel throughout the BART service area, and the significant improvements to bike travel recommended in this plan, this BART Bicycle Plan's goal is to double this rate, to 8%, by 2022. Because systemwide ridership is expected to increase by about 28% by then, including to new extension stations, achieving this goal will bring 35,000 bicycle trips to BART stations each weekday, thus transforming BART from a system that allows bikes to one that depends on them.

Plan Purpose

The purpose of this plan is twofold:

- To outline the specific strategies needed to persuade ever greater numbers of passengers to bike to and park at BART stations.
- To create a Bicycle Investment Tool that BART staff and other transit agencies can use to select the improvements that will result in the largest increases in bicycle access trips.

Recommended Strategies

The BART Bicycle Plan has but a single goal – to double the share of BART passengers systemwide who access stations by bicycle by 2022. This plan presents a number of strategies to accomplish this, organized into the following five objectives:

1. **Cyclist Circulation**
   Improve station circulation for passengers with bicycles
2. **Plentiful Parking**
   Create world-class bicycle parking facilities
3. **Beyond BART Boundaries**
   Help assure great bicycle access beyond BART's boundaries
4. **Bikes on BART**
   Optimize bicycle accommodations aboard trains
5. **Persuasive Programs**
   Complement bicycle-supportive policies and facilities with support programs

These categories include strategies that range from ideas that pertain to individual stations to those that would be applied systemwide, from approaches to expand bicycle parking options to those that improve onboard access. While the Goal & Strategies chapter suggests many ways BART could encourage more passengers to bike to its stations, the plan's last chapter focuses on the 20 expected to be the most effective, and on which BART is recommended to concentrate its resources during the ten-year plan period. The plan concludes with a list of next steps for BART staff to follow in order to implement the recommended strategies and achieve the plan goal of doubling bicycle access to BART.

Recommended strategies

❶ Cyclist Circulation

1.1 Develop and install wayfinding signage
1.2 Optimize routes between surrounding network and fare gates
1.3 Evaluate and install stairway channels
1.4 Revisit bicycles on escalators policy
1.5 Clean elevators regularly

❷ Plentiful Parking

2.1 Provide adequate bicycle parking of each type
2.2 Light all bicycle parking areas
2.3 Maintain bicycle facilities more frequently
2.4 Allow Clipper payment for bicycle parking

❸ Beyond BART Boundaries

3.1 Evaluate and implement bicycle sharing at BART stations
3.2 Support local efforts to improve bicycle access to stations
3.3 Create station area maps with recommended bike routes

❹ Bikes on BART

4.1 Provide space for bicycles in new BART cars
4.2 Evaluate blackout periods

❺ Persuasive Programs

5.1 Educate passengers and staff on use and benefits of bicycles
5.2 Improve communications with customers on BART bicycle policies and facilities
5.3 Collect access mode data before/after bicycle improvements
5.4 Evaluate and increase automobile parking fees
5.5 Participate in more Bike-to-Work day events
5.6 Fight bicycle theft

Bicycle Investment Tool

To help BART and other commuter rail operators predict the effect of an assortment of bicycle-related investments on bicycle access, and to compare these investments to the cost of providing automobile parking, this plan also includes a new Bicycle Investment Tool. The tool, which employs a simple spreadsheet interface, will help BART achieve the plan goal and implement its strategies by helping identify the investments that will encourage the most passengers to bicycle to each station, including new passengers and existing riders who shift from other modes.

Plan Development Process

The BART Bicycle Plan was developed by a team of consultants guided by BART staff in 2011 and 2012. A large External Technical Advisory Committee (TAC) – comprising bicycle planning staff from countywide agencies, local governments, representatives of countywide bicycle advocacy groups and Caltrans staff – and an Internal TAC, made up of representatives of BART Customer Access, Planning, Marketing and Research, Transportation and Operations, helped inform the process and reviewed early drafts of each plan chapter and investment tool iteration (see Acknowledgements). The BART Board of Directors reviewed and adopted the plan in June 2012.


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1 | Introduction

Plan Purpose

Like similar transit systems in Japan and Western Europe, BART can retool its stations and approach to access planning to attract thousands more bikes than cars to the system each day. Bicycling to BART, particularly when those trips replace automobile access, helps BART and the greater Bay Area in countless ways. For the transit agency, bicycle parking and other related improvements are less costly to build than auto parking; can increase ridership by passengers who, once in their cars, would drive to their destination rather than face the uncertainty of finding a BART parking space; promote fitness and public health; support related BART policies; and reinforce the agency's image as a green transportation alternative. Beyond the BART system, increasing the number of passengers who reach stations by bicycle also helps achieve regional transportation, land use, public health and climate change goals, while improving the health of passengers who bike.

> *The purpose of this plan is to help BART transform itself from a system that allows bikes to one that depends on them.*

When this plan was published, approximately 4% or about 14,000 home based passengers reached BART stations each weekday by bicycle. Thanks to the success of past BART bicycle access improvements, the growth in popularity of bicycle travel throughout the BART service area, and the significant improvements to bike travel recommended in this plan, this BART Bicycle Plan's goal is to double this rate, to 8% by 2022.

The purpose of this plan is twofold:

- To outline the specific strategies needed to persuade ever greater numbers of passengers to bike to and park at BART stations.
- To create a Bicycle Investment Tool that BART staff and other transit agencies can use to select the improvements that will result in the largest increases in bicycle access trips.

Plan Organization

There are five chapters and nine appendices in the BART Bicycle Plan. This section contains a brief description of each.

1. Introduction chapter

This chapter provides an overview of the purpose, organization and process of the development of the plan and the role of the companion Bicycle Investment Tool.

2. Existing Conditions chapter

Understanding current conditions for passengers who choose to bicycle to BART is an essential first step in planning how to improve those conditions, thereby increasing future bike access to the system. The Existing Conditions chapter presents data on historic bicycle access trends, bicycle parking facilities and use at each station, and the findings of other quantitative and qualitative research carried out for this plan. This information was used to develop the Bicycle Investment Tool, as well as the plan's goals and recommended strategies. Although much of this data is constantly changing, it provides a basis for selecting the strategies that will best achieve this plan's ambitious goal.

3. Goal & Strategies chapter

The BART Bicycle Plan has but a single goal – to double the share of BART passengers systemwide who access stations by bicycle by 2022. In the Goal & Strategies chapter, potential strategies are organized into the following five objectives:

1. Cyclist Circulation
2. Plentiful Parking
3. Beyond BART Boundaries
4. Bikes on BART
5. Persuasive Programs

Each of these categories includes strategies that range from ideas that pertain to individual stations to those that would be applied systemwide, from approaches

to expand bicycle parking options to those that improve onboard access.

4. Modeling Future Investment chapter

This plan includes a new Bicycle Investment Tool, created to help BART and other commuter rail operators predict the effect of an assortment of bicycle-related investments on bicycle access, and to compare these investments to the cost of providing automobile parking. This chapter explains the tool purpose and uses, needed inputs and output, and how BART staff will use the tool in concert with other mechanisms that influence the agency's investment decisions.

> *The BART Bicycle Plan includes a new Bicycle Investment Tool, created to help BART and other commuter rail operators predict the effect of an assortment of bicycle-related investments on bicycle access.*

5. Recommendations chapter

Of the myriad ways BART can encourage more passengers to bicycle to its stations suggested in the Goal & Strategies chapter, the plan's last chapter focuses on the 20 expected to be the most effective. The plan recommends that BART concentrate its resources on these recommended strategies during the ten-year plan period. This chapter concludes with a list of next steps with which BART staff can implement the recommended strategies and achieve the plan goal of doubling bicycle access to BART.

Appendix A: Online Survey & Responses

Appendix A provides a questionnaire distributed to the general population of BART passengers, as well as a much larger sample of self-described bicyclists, and the survey results.

Appendix B: Bike Station Survey & Responses

BART passengers who use the system's two attended bike stations were asked to complete a survey in 2011. The survey instrument and results are reproduced in this appendix.

Appendix C: Summary of Focused Group Discussions

Four focused group discussions were held in May 2011 with BART passengers, most of whom currently reach stations by means other than the bicycle, but who routinely bike for other trips. Appendix C provides a summary of the challenges and solutions to encouraging passengers to access BART by bike suggested by participants, as well as responses to questions posed at the meetings.

Appendix D: Summary of Countywide Advocate & BPAC Meetings

Meetings with representatives of the East Bay Bicycle Coalition (representing cyclists in Alameda and Contra Costa counties) and the San Francisco Bicycle Coalition were held in 2011 to discuss needed station and station area improvements. Members of Bike San Mateo, a virtual organization, submitted input online and were represented on the plan's External Technical Advisory Committee. Meetings were also held with the countywide bicycle and pedestrian advisory committees in Alameda, Contra Costa, San Francisco and San Mateo counties in 2011. This appendix also contains a summary of the suggestions communicated in these meetings.

Appendix E: History of Station Improvements

Augmenting Existing Conditions chapter Table 6, this appendix compares station-specific bicycle parking and other access improvements BART made between 1998 and 2008 to changes in bicycle access to those stations during the same period.

Appendix F: Needed Station Area Improvements

This appendix lists what is considered by local bicycle planners to be the most needed improvements to safe and convenient bicycle access off of BART property at each of BART's 44 stations. During the five years before this plan was published, the Metropolitan

Transportation Commission (MTC) and Caltrans have provided considerable funding to various cities for station area planning, including an analysis of multi-modal station access. Many of these locations are near BART stations, including San Leandro, South Hayward, Union City, Balboa Park, Daly City, North Concord, 19th Street, Lake Merritt, Fruitvale, MacArthur, Walnut Creek and Dublin/Pleasanton stations.

Appendix G: Investment Tool User's Guide

Appendix G supplements the Bicycle Investment Tool chapter and link to the spreadsheet tool itself by providing specific guidance to tool-users.

Appendix H: Investment Tool Development History

The history of the development of the Bicycle Investment Tool is provided in this appendix, as well as suggestions for future improvements to the tool.

Appendix I: Potential Funding Sources

Appendix I provides a summary of funding sources expected to be available over the life of the plan that could be used for the wide range of recommended investments.

Plan Development Process

A successful 2009 grant proposal to the Caltrans Statewide Transit Planning Studies program defined the parameters of this plan (and helps explain the less traditional structure and contents). The plan helps implement the Transit-Oriented Development (TOD) policy adopted by the BART Board in 2005, "Reduce the access mode share of the automobile by enhancing multi-modal access to and from BART stations in partnership with communities and access providers." This plan also supports BART goals, strategies and targets laid out in the 2008 Strategic Plan regarding access, transit-oriented development and sustainability. It was developed by a team of consultants guided by BART staff between spring 2011 and spring 2012. A large External Technical Advisory Committee (TAC) and a smaller Internal TAC reviewed each chapter and investment tool iteration. The External TAC comprised bicycle planning staff from countywide agencies, local governments, representatives of countywide bicycle advocacy groups and Caltrans staff (see Acknowledgements). BART Customer Access, Planning, Marketing and Research, Transportation and Operations staff made up the Internal TAC. The BART Board of Directors reviewed and adopted the plan in June 2012.

2 | Existing Conditions

Introduction

This chapter paints a picture of the current conditions for accessing BART by bicycle and provides the understanding necessary to transform BART from a transit system that allows bikes to one that depends on them. It focuses on how many people are accessing BART by bicycle, at what stations, and why they choose to do so (or not).

> *Between1998 and 2008, BART's bicycle access rate increased by 69%, while daily ridership increased by just 27% during the same period.*

The research includes bicycle access trends between 1998 and 2008, comparisons of bike facilities between stations, and qualitative input from passengers and focus groups, all of which inform the investment tool, strategies and recommendations in the BART Bicycle Plan. Specific data include access mode split, bicycle parking supply and utilization, onboard bicycle access rates, and factors that influence BART passengers' decision to access BART by bicycle. These factors fall into seven categories: bicycle parking, onboard bicycle access, transporting bicycles through stations, communication, auto parking charges, first and last mile, and other factors.

Although each station is unique, in order to facilitate the analysis of access mode, BART has grouped the stations into five categories or typologies, based on land use surrounding the station, the presence or absence of automobile parking, degree of auto dependency and availability of multiple modes (see Figure 1). These typologies will be discussed in more detail in Chapter 4 in the context of the investment model.

Key findings of Existing Conditions chapter

1. The original 2002 BART Bicycle Plan established a goal of 3% bicycle access by 2010 (from 2.5% in 2002). By that year, the goal was exceeded with 4.1% of passengers biking to BART.
2. Between 1998 and 2008, the bicycle access rate increased by 69%, while daily ridership increased by just 27% during the same period.
3. There is a high correlation between investment in secure bicycle parking and increased bicycle access mode share.
4. Although there is not necessarily direct evidence that parking charges lead to greater bicycle use, those stations that began charging for auto parking between 1998 and 2008 for the most part had the largest increases in bicycle access during that period. Furthermore, stations with large quantities of free parking tended to have the lowest rates of non-car access.
5. Among bicycle racks located outside of station fare gates, those that are closer to the fare gates are utilized far more than those that are farther away.
6. A majority of weekday passengers who bike to BART do not park their bicycles at the station, but rather bring them onboard a train.
7. Over 20% of surveyed attended bicycle station[1] users said they would bring their bike onboard the train if they didn't have access to the safe and secure bike parking that bike stations provide.
8. Focus group participants—BART passengers who bike at least weekly, but not to access BART—stated that because the blackout period limits the possibility of commuters bringing a bike on BART, passengers with bicycles are required to plan ahead to a much greater extent than other passengers.

[1] BART uses the term bike station to describe both attended and self-serve group parking facilities. The attended facilities provide related services such as bicycle repair, rental and retail sales.

Figure 1: BART station typologies

Source: *Access BART, 2006*

Data Sources

Background data for the Existing Conditions chapter came from quantitative surveys—either performed specifically for the Plan update or for previously published BART research—and qualitative methods.

Quantitative research

1998 and 2008 Station Profile Studies

These comprehensive surveys provide a snapshot of weekday BART customers at each BART station and for the overall system. The most recent station profile information, from 2008, was drawn from 50,000 surveys completed by a time-stratified sample of weekday riders, which randomly selects passengers in four separate time periods to survey. The Station Profile Study, which highlights passengers' demographics and station access patterns, has been an important source of BART ridership data over the years; the first was launched in 1973 and the 2008 version is the 13th such study in BART's 39-year operating history. The data from these studies allows comparison between 1998 and 2008 bicycle access mode share, as well as being the most recent comprehensive source of station-specific access mode share data. The full 2008 study is available at www.bart.gov/about/reports/profile.aspx.

BART Customer Satisfaction Surveys

BART customers are surveyed every two years to determine how well BART is meeting customers' needs and expectations. The latest study was performed in 2010 and was completed by over 5,800 passengers, who rated 47 service attributes, ranging from on-time performance to station cleanliness. Although not as comprehensive with respect to bicycle-related information, the survey offers the most recent estimate of the number of BART passengers who access stations by bicycle. See www.bart.gov/docs/CustSatReport_2010.pdf for the 2010 survey.

2011 BART Passenger Online Survey

Conducted specifically for the development of the BART Bicycle Plan, this survey sought input on bicycling to BART from all passengers, including those who currently bike to BART and those who reach BART by other means. BART solicited input from "typical passengers" (i.e., the general population of riders, some of whom bike to stations, but most of whom do not) via an email solicitation to the agency's passenger email list and a banner on bart.gov. The "cyclist-heavy sample" was recruited via the countywide bicycle coalitions in BART's service area.

> *An online survey was conducted specifically for the development of this plan, which sought input on bicycling to BART from all passengers, including those who currently bike to BART and those who reach BART by other means.*

Table 1: Highlights from the 2011 online survey

	Typical Passenger Sample	Cyclist-Heavy Sample
Who?	Sent to database of BART riders; Representative of general riding public	Advertised on bart.gov and distributed by bicycle advocacy groups
# respondents	488	3,886
% bike access	6%	56%
Home-to-station distance	70% three miles or less	80% three miles or less
Why do you bike to BART?	#1: Healthy/for exercise #2: Good for the environment	#1: Most convenient travel option #2: Healthy/for exercise
How possible to bike to BART?	33%: "very possible"	47%: "very possible"

Although all respondents completed the same survey, the findings of the 488 passengers who responded to the general invitation were analyzed separately from those of the 3,886 who accessed the survey via a bike coalition link. All respondents were asked to rank how they feel about current bicycle access routes to stations, the location and amount of bicycle parking at stations, and the ease/difficulty of bringing bikes through stations and on board trains. Respondents were also asked to rank the degree to which certain barriers deter them from riding, such as fear of theft from insufficient secure bike parking or the lack of safe bike lanes on city streets leading to stations, and to rank possible solutions to overcome such barriers, such as more bicycle parking or the ability to bring bikes on train cars at all times. This data is one of the foundations of the bicycle investment spreadsheet model being developed in conjunction with this plan (see chapter 4). See Table 1 for survey highlights and Appendix A for complete survey responses.

2011 Bike Station Survey

BART passengers who currently use the two staffed BART Bike Stations—at the Fruitvale and Downtown Berkeley stations—were also surveyed in 2011.[2] The survey asked respondents why and how often they use the bike station, whether they would still bicycle to BART without a bike station, and whether they use BART after parking their bike or have a local destination (the bike station at the Downtown Berkeley station is located outside of the station). The findings of this survey also informed the investment model. For details about this survey, refer to Appendix B.

2011 Bicycle Parking Inventory

Bicycle parking at all 42 BART stations that provide parking was inventoried for supply and occupancy in spring 2011. For each station, parking and occupancy were catalogued by type and location, in relation to the fare gates. Although this inventory offers a "snapshot" of parking occupancy at one point in time, the data from this effort is very useful for the investment model as it shows what type of bicycle parking passengers prefer when provided with a choice. See Table 4.

[2] The Embarcadero bike station shifted from staffed to automated in October 2009, so users of this facility were not surveyed.

Qualitative data

The following meetings and workshops took place in 2011:

Focused Group Meetings

Four focused discussions with on average 10 invited attendees each were held with BART passengers residing in south Alameda County, San Francisco/San Mateo Counties, north Alameda/west Contra Costa counties, and central/eastern Contra Costa County. Workshop participants who met particular criteria were selected from BART's passenger database. These criteria included riding BART regularly, currently driving to the station, and using a bicycle at least weekly (although not necessarily to reach BART). At each focus group, participants discussed the reasons why they do not bike to BART and possible solutions to overcome their stated barriers. The focus groups also included a few people who currently do ride their bicycles to access BART stations, who offered recommendations on how to improve bike access to and on the system. See Appendix D (summary challenge/solution table).

> *Four focused discussions with on average 10 invited attendees each were held with BART passengers who ride BART regularly, currently drive to the station, and use a bicycle at least weekly (although not necessarily to reach BART).*

Advocate meetings

With the aid of aerial maps of each station area, face-to-face and virtual discussions with representatives of the three bicycle advocate groups in the four BART-served counties (East Bay Bicycle Coalition for Alameda and Contra Costa counties, San Francisco Bicycle Coalition, and Bike San Mateo County) were held to reveal station-specific barriers and suggested solutions. Advocates offered their recommendations for improving bicycle parking and access improvements by referencing what currently works

well in the BART bike system and other best practices (see Appendix D).

Bicycle/Pedestrian Advisory Committee meetings

Project representatives attended the Countywide Bicycle and/or Bicycle/Pedestrian Advisory Committee meetings in Alameda, Contra Costa, San Francisco and San Mateo counties. The agendas of these meetings included presentations of project goals and timeline and opportunities for public input and review of the draft document, and review of the station aerials, as occurred during the advocate meetings. Write-ups of these meetings are also found in Appendix D.

> *Two technical advisory committees (TACs) helped inform the plan development process and reviewed early drafts of most plan chapters and the investment tool.*

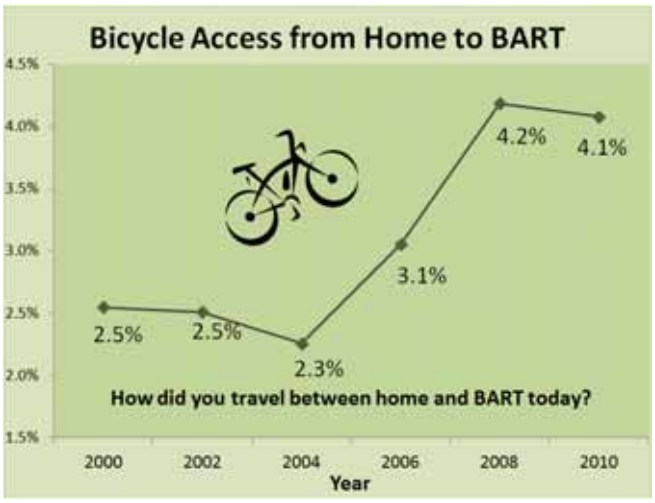
TAC meetings

Two technical advisory committees (TACs) helped inform the plan development process and reviewed early drafts of most plan chapters and the investment tool. The External TAC comprised bicycle planning staff from countywide agencies, local governments, representatives of countywide bicycle advocacy groups and Caltrans staff. The Internal TAC was made up of representatives of BART Customer Access, Planning, Marketing and Research, Transportation and Operations (see Acknowledgements). Both committees met four times, as follows, to review:

1. The project scope
2. The Existing Conditions and Modeling Future Investment chapters and draft Bicycle Investment Tool
3. The Goal & Strategies and Recommendations chapters, and the Bicycle Investment Tool
4. The draft Plan

Bicycle access mode share by station

BART's stated goal in its 2002 Bicycle Access and Parking Plan was to increase the percentage of passengers who access BART stations by bicycle from 2.5% in 2002 to 3.0% by 2010, an increase of 20%. With a system-wide bicycle access rate of 4.1% in 2010 (a 60% increase over 2002 levels), BART has greatly surpassed this goal.[3]



Data from BART's most detailed Station Profile Studies shows an increase of about 6,000 daily bicycle station access trips in the decade between 1998 and 2008: about 8,600 access trips to/from BART were made via bicycle on an average weekday in 1998, while that increased to about 14,500 in 2008. This is equivalent to a 69% increase over the 10-year period, compared to a 27% increase in total daily ridership over the same period. The increased bicycle access rate is a systemwide average and varies greatly by station. Table 2 shows the bicycle access mode share for home origin trips for 42 BART stations for the years 1998 and 2008, the absolute change in bike access (i.e., 2008 rate minus 1998 rate, comparable to the figures used to calculate progress toward BART's access mode goal) and the percent change between those years (i.e., the rate difference between 1998 and 2008 divided by the 1998 rate, useful for evaluating the access mode change at a particular station relative to itself).[4] Appendix E compares station-specific bicycle parking and other access improvements BART made between 1998 and 2008 to changes in bicycle access to those stations during the same period.

[3] 2010 BART Customer Satisfaction Survey

[4] 1998 and 2008 Station Profile Studies. Two stations were not included: SFO has no bicycle parking or access; West Dublin/Pleasanton opened in 2011, after both surveys were conducted.

The stations at which bicycle mode share increased between 1998 and 2008 include all types of BART stations—from the suburban to the urban, and from transfer stations to stations served by just one line. During this period, the station with the largest absolute increase in access via bicycle was Fruitvale (+5.6 percentage points). The top six stations with increases are all in Berkeley and Oakland, mirroring city-wide mode shifts towards non-motorized transportation in these cities. Indeed, Berkeley and Oakland exhibit some of the highest bicycle commute rates in California, at 6.5% and 2.1%, respectively.[5] Both cities have adopted aggressive bicycle master plans; citywide investment in both capital and programmatic interventions to encourage non-motorized transportation likely contributed to these dramatic increases in station access via bicycle.

> *While systemwide ridership increased 27% between 1998 and 2008, bicycle access to BART increased 69% in the same period.*

Additionally, while Fruitvale experienced the largest percentage point increase in bicycle mode share from home, the station with the highest percent change was West Oakland, where bicycle access increased 433% (from 0.9% to 4.8%). The City of Oakland's 2007 Bicycle Master Plan supports these observations: the bike mode share for census tracts near BART stations is generally higher than that of other Oakland neighborhoods.[6] Other stations with large relative increases between 1998 and 2008 include El Cerrito Del Norte, 24th St. Mission, and Balboa Park, at 263%, 243%, and 171%, respectively.

The stations that experienced a decrease in access via bicycle between 1998 and 2008 range from stations in San Francisco's retail and financial centers (Powell and Montgomery), to end of the line stations in suburban East Bay locations (Dublin/Pleasanton and Pittsburg/Bay Point). From 1998 to 2008 the Coliseum saw the largest absolute decrease in bicycle mode share (-2.0 percentage points).

[5] American Community Survey 5 Year Estimates (2005-2009)

[6] *Oakland Bicycle Master Plan*, 2007.

Factors influencing bicycle access

The remainder of this chapter discusses the following factors that influence or are otherwise related to bicycle access to BART stations:

- Bicycle parking
- Onboard bicycle access
- Transporting bicycles through stations
- Communication
- Automobile parking
- First and Last Mile
- Other factors

Bicycle parking

The BART system currently has a total of 4,574 bicycle parking spaces at 42 of its stations (neither the Montgomery nor the San Francisco International Airport stations have bicycle parking), including bicycle racks (inside and outside the fare gates), bicycle lockers (keyed and electronic), and bike stations (attended and self-service) (see Table 4). The Association of Pedestrian and Bicycle Professionals (APBP) divides bicycle parking into short-term and long-term categories in terms of their degree of security and weather protection. Although these groupings don't necessarily apply perfectly to BART, where passengers typically leave their bicycles for many hours, since some prefer the convenience of racks outside the fare gates, while others would rather leave their bikes inside the station, the system provides what can be considered a continuum of parking options that differ in terms of level of security, convenience and cost.

> *Although the best places for bike racks at a given station must be identified on a station-specific basis, other considerations include whether or not they're in view of the station agent booth, are in an area with frequent pedestrian traffic, have good lighting and are protected from the weather.*

Table 2: Home-to-BART bicycle access mode share (1998 and 2008)

Station	1998	2008	Absolute change	Percent change
12th Street/Oakland	1%	3%	2%	136%
16th Street Mission	3%	5%	2%	59%
19th Street/Oakland	3%	6%	4%	148%
24th Street Mission	1%	5%	3%	243%
Ashby	7%	12%	4%	58%
Balboa Park	1%	2%	1%	171%
Bay Fair	2%	2%	0%	16%
Castro Valley	1%	2%	1%	90%
Civic Center	5%	5%	0%	0%
Coliseum	2%	1%	-2%	-77%
Colma	0%	1%	1%	NA
Concord	2%	3%	2%	100%
Daly City	0%	1%	1%	NA
Downtown Berkeley	6%	10%	4%	69%
Dublin/ Pleasanton	2%	1%	-1%	-26%
El Cerrito del Norte	1%	3%	2%	263%
El Cerrito Plaza	4%	6%	3%	78%
Embarcadero	8%	9%	1%	18%
Fremont	2%	1%	-1%	-30%
Fruitvale	4%	10%	6%	130%
Glen Park	2%	2%	1%	31%
Hayward	3%	1%	-2%	-63%
Lafayette	2%	2%	1%	33%
Lake Merritt	5%	8%	3%	52%
MacArthur	4%	8%	4%	86%
Millbrae	NA	1%	NA	NA
Montgomery	2%	1%	-1%	-38%
North Berkeley	5%	8%	3%	56%
North Concord/ Martinez	1%	1%	0%	-33%
Orinda	2%	2%	0%	18%
Pittsburg/ Bay Point	1%	1%	-1%	-62%
Pleasant Hill	2%	3%	1%	55%
Powell	3%	2%	-1%	-20%
Richmond	3%	2%	-1%	-25%
Rockridge	3%	5%	2%	55%
San Bruno	NA	2%	NA	NA
San Leandro	2%	3%	1%	73%
South Hayward	2%	2%	0%	-16%
South San Francisco	NA	1%	NA	NA
Union City	2%	2%	-1%	-24%
Walnut Creek	2%	2%	0%	0%
West Oakland	1%	5%	4%	433%

Source: BART Station Profile Studies (1998 and 2008)

Table 3: Bicycle parking offered at BART stations

Parking Type	Description
Bicycle rack (outside fare gates)	Inverted U-shaped racks installed outside fare gates
Bicycle rack (inside fare gates)	Inverted U-shaped racks installed inside fare gates
Bicycle lockers (keyed)	Metal bicycle lockers that are rented on a quarterly or semi-annual basis, locked with a key, which is assigned to a single user
Bicycle lockers (electronic)	Metal bicycle lockers that are reserved on-demand using an electronic debit card issued for this purpose
Bike station (attended)	Attended valet bicycle parking facility
Bike station (self-serve)	Group bicycle parking facility with access limited to debit card holders (see electronic bicycle locker description, above)

Bicycle racks

BART stations provide a variety of "wave" or "ribbon" racks and inverted U racks (see photos).

Inverted U-racks

Ribbon rack

Passengers use their own locks to attach bicycles to each. Bicycle racks may be located either inside or outside the fare gates. Passengers' stated preferences, occupancy rates (see Table 5) and theft statistics indicate that being located inside a fare gate makes a rack more likely to be used and more likely to protect a bicycle from theft than those outside the gates. Although the best places for bike racks at a given station must be identified on a station-specific basis, other considerations include whether or not they're in view of the station agent booth, are in an area with frequent pedestrian traffic, have good lighting and are protected from the weather.

Bicycle lockers

Lockers, which are either keyed (i.e., reserved for one user) or electronic (and are available on a first come, first served basis), provide a higher level of security than racks by protecting the entire bicycle from theft and rain. BART is in the process of removing some keyed lockers in locations where "real estate" is limited in favor of electronic lockers that are accessed with a prepaid BikeLink[7] card. The long-term plan is to migrate to the Clipper Card for electronic bike locker access and not to purchase additional keyed lockers. Some existing plastic keyed lockers are being removed where vandalism has been an issue.

[7] Electronic stored value cards that allow access to bicycle lockers and automated bike stations throughout the BART system and beyond.

Bicycle lockers

Bicycle stations

Stations, which can be attended ("valet") or automated and accessible with a prepaid BikeLink card, are group bicycle parking "garages," located at or near BART stations.

Most bicycle parking in the BART system is in the form of bicycle racks (63%, or 2,835 spaces), and of these, most are located outside of the fare gates (368 racks, or 9% of total bike parking, are located inside the station fare gates). A majority of lockers are keyed (670 out of 996 total lockers). The types and locations of bicycle parking also vary by station. The racks at some stations, such as West Dublin/Pleasanton and Castro Valley, are all located outside of and far from the fare gates, while the bicycle parking supply of others, such as Ashby, include racks inside and outside the fare gates, lockers, and a bike station. Table 4 shows the number of bicycle parking spaces by type and location for the BART system.[8]

Table 4 shows the percent of each type of bicycle parking that was occupied one clear, spring day in 2011, by station. The highest bicycle parking occupancy rate was at the Powell Street station in Downtown San Francisco, which primarily indicates the inadequacy of seven bicycle parking spaces at that location. At MacArthur BART, the system's busiest transfer station located in a residential neighborhood, 92% of bicycle parking spaces were occupied. North Concord/Martinez, South San Francisco and Colma stations all had bicycle parking occupancy rates of less than 10%.

Is more bicycle parking needed?

According to Focus Group participants and online survey respondents, the lack of sufficient bike parking perceived as being secure is a major obstacle to bicycling to BART (see Appendix A). But do the numbers bear this out?

BART stations collectively provide over 4,500 total bicycle parking spaces (see Table 4), while an average of just 40% of spaces at each station are occupied each weekday (see Table 5). Rather than indicating excess capacity, however, this mismatch is a sign of excess supply of certain kinds of spaces (e.g., racks far from the fare gates, whose average occupancy is 22%), while other stations have an insufficient number of desirable bike parking spaces (e.g., inside the fare gates, lockers and bike stations, average occupancy 94%, 56% and 31%, respectively). Therefore, it is fair to say that, despite vacant spaces, there is a need for more bike parking, particularly certain types at certain stations.

[8] No bicycle parking is provided at SFO or Montgomery stations.

Table 4: BART bicycle parking inventory[1] (numbers indicate spaces for individual bikes)

	Rack supply					Locker supply			
	Outside fare gates[2]			Inside	Total			Bike	Total parking supply
Station	Close	Medium	Far	fare gates	racks	Elec.	Keyed[3]	stations	(all types)
12th St/Oakland[4]	-	-	62	-	**62**	8	-	-	**70**
16th St/Mission	-	-	-	77	**77**	-	-	-	**77**
19th St/Oakland[4]	66	-	51	-	**117**	8	-	-	**125**
24th St/Mission	-	-	-	70	**70**	-	-	-	**70**
Ashby	-	122	-	14	**136**	-	24	128	**288**
Balboa Park	-	-	28	60	**88**	-	12	-	**100**
Bay Fair	28	14	-	-	**42**	-	16	-	**58**
Castro Valley	-	-	20	-	**20**	-	20	-	**40**
Civic Center	-	-	-	63	**63**	-	-	-	**63**
Coliseum/OAK	-	-	63	-	**63**	-	2	-	**65**
Colma	40	-	-	-	**40**	-	24	-	**64**
Concord	21	98	-	-	**119**	16	12	-	**147**
Daly City	-	49	-	-	**49**	4	-	-	**53**
Downtown Berkeley[5]	-	-	20	-	**20**	-	-	268	**288**
Dublin/Pleasanton	20	10	34	14	**78**	12	24	-	**114**
El Cerrito Del Norte	-	126	-	-	**126**	-	28	-	**154**
El Cerrito Plaza	-	94	-	-	**94**	48	-	-	**142**
Embarcadero	-	-	-	-	**-**	-	-	96	**96**
Fremont	105	16	-	-	**121**	-	34	-	**155**
Fruitvale	-	49	-	-	**49**	-	24	200	**273**
Glen Park	7	21	-	21	**49**	-	12	-	**61**
Hayward	70	-	-	-	**70**	-	20	-	**90**
Lafayette	22	42	-	-	**64**	-	30	-	**94**
Lake Merrit	-	21	-	-	**21**	32	-	-	**53**
MacArthur	84	-	-	42	**126**	40	-	-	**166**
Millbrae	-	40	-	-	**40**	-	40	-	**80**
North Berkeley	8	143	-	-	**151**	48	-	-	**199**
North Concord/Martinez	-	42	18	-	**60**	-	16	-	**76**
Orinda	18	8	-	-	**26**	-	24	-	**50**
Pittsburg/Bay Point	-	-	24	-	**24**	-	20	-	**44**
Pleasant Hill	28	196	-	-	**224**	24	92	-	**340**
Powell	-	-	-	7	**7**	-	-	-	**7**
Richmond	21	-	21	-	**42**	16	2	-	**60**
Rockridge	-	69	64	-	**133**	32	-	-	**165**
San Bruno	10	-	8	-	**18**	-	30	-	**48**

Station	Rack supply: Outside fare gates[2] Close	Medium	Far	Inside fare gates	Total racks	Locker supply: Elec.	Keyed[3]	Bike stations	Total parking supply (all types)
San Leandro	21	72	-	-	**93**	20	12	-	**125**
South Hayward	56	-	-	-	**56**	-	30	-	**86**
South San Francisco	-	30	-	-	**30**	-	30	-	**60**
Union City	8	-	-	-	**8**	-	20	-	**28**
Walnut Creek	21	70	-	-	**91**	-	64	-	**155**
West Dublin/Pleasanton	-	-	28	-	**28**	-	-	-	**28**
West Oakland	21	63	7	-	**91**	18	8	-	**117**
Total	675	1,395	448	368	**2,886**	326	670	692	**4,574**

Neither Montgomery nor San Francisco Airport stations have bicycle parking, and so are not included in this table.

[1] The parking inventory constantly changes. This table represents the inventory at a single point in time (May 2011).

[2] Close: within 25' of fare gates; Medium: within 100' of fare gates; Far: greater than 100' or not visible from fare gates. All racks outside fare gates are considered short term parking (see p. 10).

[3] After the inventory was conducted, but before this Plan was published, BART replaced the following numbers of keyed locker spaces with eLocker spaces: Fremont 34; Hayward 20; El Cerrito del Norte 24; Walnut Creek 48; Orinda 16.

[4] "Far" racks and eLockers at 12th and 19th Street Oakland stations are provided by City of Oakland and are at street level.

[5] Downtown Berkeley's bike station has 155 attended and 113 self-serve spaces.

Not enough bicycle parking was a common complaint by participants in focus groups conducted to inform this plan, especially at urban stations such as those in downtown San Francisco (see box). In some locations, this issue may be exacerbated by non-BART riders using parking, particularly at street-level urban stations, such as the downtown Oakland racks and eLockers (which are provided by City of Oakland) and attended bike stations at Fruitvale and downtown Berkeley (a joint venture with the City). Also commonly voiced was that there isn't enough information on where bike parking is located and how storage, especially bike stations and reserved lockers, works.

The perceived security of bicycle parking was also reported to be a major factor in determining where to park one's bike at a given BART station. For example, at nearly every station, among bike racks located outside the station fare gates, those that are within 10 paces, or around 25 feet, of the fare gates are occupied more than those that are within 100 feet of the fare gates or parking that is not visible from the fare gates or over 100 feet away. At the Dublin/Pleasanton station, for example, racks classified as "close" to the fare gates are 90% occupied, while "medium" and "far" rack spaces are only 60% and 3% occupied, respectively. Racks that are located inside the fare gates are at an average of 121% of capacity (a rack can be more than 100% occupied if it is holding more bikes than it was designed to accommodate), most likely because passengers feel they are safer and more convenient than those accessible by the general public.

Since 2002, BART has implemented myriad bicycle parking improvements at nearly all of its stations. In most cases, high levels of investment in bicycle infrastructure have corresponded to high or increasing levels of bicycle use. For example, both Fruitvale and the Downtown Berkeley stations saw large increases in bicycle use after the completion of new bike stations. On average, stations with high levels of investment experienced both the greatest increase in access via bicycle and the highest rates of bicycle access. Table 6 presents a list of bicycle access improvements instituted since 2002.

Table 5: BART bicycle parking occupancy

Station	Rack occupancy[1]					Locker occupancy		Bike stations	Total parking occ. (all types)
	Outside fare gates			Inside fare gates	Total racks[2]	Elec.	Keyed[3]		
	Close	Medium	Far						
12th St/Oakland	*	*	21%	*	**21%**	88%	*		**29%**
16th St/Mission	*	*	*	68%	**68%**	*	*		**68%**
19th St/Oakland	62%	*	71%	*	**66%**	88%	*		**67%**
24th St/Mission	*	*	*	84%	**84%**	*	*		**84%**
Ashby	*	58%	*	150%	**68%**	*	25%	12%	**39%**
Balboa Park	*	*	14%	43%	**34%**	*	**		**34%**
Bay Fair	57%	21%	*	*	**45%**	*	25%		**40%**
Castro Valley	*	*	10%	*	**10%**	*	**		**10%**
Civic Center	*	*	*	84%	**84%**	*	*		**84%**
Coliseum/OAK	*	*	10%	*	**10%**	*	**		**10%**
Colma	8%	*	*	*	**8%**	*	**		**8%**
Concord	81%	12%	*	*	**24%**	0%	**		**20%**
Daly City	*	6%	*	*	**6%**	25%	*		**8%**
Downtown Berkeley	*	*	100%	*	**100%**	*	*	43%	**47%**
Dublin/Pleasanton	90%	60%	3%	121%	**54%**	33%	**		**54%**
El Cerrito Del Norte	*	14%	0%	*	**14%**	*	**		**14%**
El Cerrito Plaza	*	40%	*	*	**40%**	73%	*		**51%**
Embarcadero	*	*	*	*	**0%**	*	*	28%	**28%**
Fremont	30%	63%	*	*	**34%**	*	**		**34%**
Fruitvale	*	67%	*	*	**67%**	*	**	40%	**67%**
Glen Park	57%	14%	*	81%	**49%**	*	**		**49%**
Hayward	44%	*	*	*	**44%**	*	**		**44%**
Lafayette	86%	17%	*	*	**41%**	*	**		**41%**
Lake Merrit	*	86%	*	*	**86%**	91%	*		**89%**
MacArthur	86%	*	*	114%	**95%**	80%	*		**92%**
Millbrae	0%	13%	*	*	**13%**	*	**		**13%**
North Berkeley	100%	71%	*	*	**73%**	77%	*		**74%**
North Concord/Martinez	*	5%	0%	*	**3%**	*	**		**3%**
Orinda[4]	44%	0%	*	*	**31%**	*	0%		**24%**
Pittsburg/Bay Point	*	*	33%	*	**33%**	*	**		**33%**
Pleasant Hill	86%	36%	*	*	**42%**	92%	**		**42%**
Powell	*	*	*	100%	**100%**	*	**		**100%**
Richmond	57%	0%	0%	*	**29%**	0%	**		**29%**
Rockridge	*	71%	36%	*	**54%**	50%	*		**53%**
San Bruno	60%	0%	38%	*	**50%**	*	**		**50%**

Station	Rack occupancy[1]					Locker occupancy		Bike stations	Total parking occ. (all types)
	Outside fare gates			Inside fare gates	Total racks[2]	Elec.	Keyed[3]		
	Close	Medium	Far						
San Leandro	43%	18%	*	*	**24%**	100%	33%		**37%**
South Hayward	16%	*	*	*	**16%**	*	**		**16%**
South San Francisco	*	7%	*	*	**7%**	*	**		**7%**
Union City	38%	*	*	*	**38%**	*	35%		**36%**
Walnut Creek[5]	86%	44%	*	*	**54%**	0%	2%		**47%**
West Dublin/Pleasanton	*	*	39%	*	**39%**	*	*		**39%**
West Oakland	57%	30%	0%	*	**34%**	50%	50%		**38%**
Averages	52%	26%	37%	77%	**43%**	57%	17%		**41%**

Neither Montgomery nor San Francisco Airport stations have bicycle parking, and so are not included in this table.

[1] Racks with occupancy rates >100% represent those holding more bikes than they are designed for (wave racks designed for 7, U racks for 2)

[2] Total Rack counts do not double-count racks under rain cover (which are included either in the "outside fare gates" or "inside fare gates" counts.

[3] Only visible keyed lockers (i.e. lockers with perforated doors/walls) counted

[4] Orinda occupancy calculations assume only 8 of 24 keyed lockers whose contents were visible.

[5] Walnut Creek occupancy calculations assume only 16 of 64 keyed lockers whose contents were visible.

* Not applicable because there is no bike parking of this type.

** Contents not visible, so occupancy was not considered in Total Parking Occupancy figures.

Table 6: BART bicycle access improvements by station* (2002-2011)

Station	Improvements
12th Street	No BART bike parking (City of Oakland facilities at street level)
16th Street	77 paid area wave racks and signage (2000). Stair channel (2007)
19th Street	64 rack spaces on concourse level (October 2010)
24th Street	70 paid area racks (2005)
Ashby	93 rack spaces added (2001/02). 12 retrofitted electronic lockers plus 24 are keyed metal lockers (2007/2008). 128- space self-service bike station (2011).
Balboa Park	30 rack spaces added (2001/02). 65 paid area racks (2006)
Bay Fair	42 rack spaces added (2001/02). 16 keyed metal lockers--from San Leandro (2007/2008)
Castro Valley	20 rack spaces, 20 locker spaces at opening (May 1997)
Civic Center	63 paid area racks (2005)
Coliseum	63 rack spaces added (2001/02).
Colma	24 rack spaces at opening, 24 keyed lockers (June 2003)
Concord	119 rack spaces added (2001/02). 16 Bicycle Parking Network--phone reservation (2005)
Daly City	32 rack spaces added (2001/02). 20 locker spaces added (2001/02). 4 retrofitted electronic lockers (2007/2008)
Downtown Berkeley	Concourse level bike station opened (1996). 268-space combined valet and self-service Shattuck Ave replacement bike station opened (July 2010)
Dublin/ Pleasanton	66 rack spaces at opening (1997). 12 retrofitted electronic lockers--from MacArthur (2007/2008)
El Cerrito Del Norte	154 rack spaces added (2001/02).
El Cerrito Plaza	94 rack spaces added (2001/02). 48 adjacent electronic lockers by City of El Cerrito (2002).
Embarcadero	130-space self-service bike station (2002)
Fremont	121 rack spaces added (2001/02).
Fruitvale	49 rack spaces added (2001/02). 200-space attended bike station (2004)
Glen Park	44 rack spaces added (2001/02). Paid area racks (2006)
Hayward	70 rack spaces added (2001/02).
Lafayette	84 rack spaces added (2001/02).
Lake Merritt	21 rack spaces added (2001/02). 12 lockers spaces added (2001/02). 32 retrofitted electronic lockers; 20 old plastic lockers removed (2007/2008).
MacArthur	84 rack spaces added (2001/02). 40 eLockers; old 30 keyed metal lockers retrofitted and moved to 3 stations (12 to N..Berkeley, 12 to Dublin/Pleasanton, 6 to West Oakland), 56 plastic lockers removed (2007/2008).
Millbrae	40 rack spaces and 40 keyed locker spaces (June 2003)
Montgomery	No bicycle facilities
North Berkeley	Covered wave racks, plastic lockers--58 spaces (1998). 94 rack spaces added (2001/02). 12 retrofitted electronic lockers (from MacArthur) plus 36 eLockers and 58 plastic lockers removed (2007/2008).

Station	Improvements
North Concord/ Martinez	30 rack spaces added (2001/02).
Orinda	26 rack spaces added (2001/02). 8 keyed lockers spaces added (2001/2002).
Pittsburg/Bay Point	24 rack spaces and 20 keyed lockers at opening (Dec 1996)
Pleasant Hill	224 rack spaces added (2001/02). 24 eLockers (2006/07).
Powell	7 paid area rack spaces (2005)
Richmond	42 rack spaces added (2001/02). 16 electronic lockers (2006/07)
Rockridge	126 rack spaces added (2001/02). 32 eLockers; 20 plastic lockers removed (2007/2008).
San Bruno	18 rack spaces and 30 keyed lockers (June 2003)
San Francisco Airport	No bicycle facilities
San Leandro	84 rack spaces added (2001/02). Swap plastic/metal lockers (2001/02). 20 electronic lockers plus 12 keyed metal lockers; 16 keyed metal lockers moved to Bay Fair (2007/2008).
South Hayward	56 rack spaces added (2001/02).
South San Francisco	30 rack spaces and 30 keyed lockers (June 2003)
Union City	69 rack spaces added (2001/02). 20 locker spaces added (2001/02).
Walnut Creek	91 rack spaces added (2001/02). 16 locker spaces added (2001/02).
West Dublin/ Pleasanton	Racks in garages on both Dublin and Pleasanton sides (2011)
West Oakland	84 racks spaces added (2001/02). 6 retrofitted electronic lockers--from MacArthur (2007/2008).

* Improvements listed are limited to those on BART property.

Source: BART, 2011

See Appendix E for a comparison of 1998-2008 change in mode share by station alongside the station improvements made during that period. As shown in Table 7, on average, stations with high levels of investment saw both the greatest increase in access via bicycle, and the highest rates of bicycle access in 2008. Comparing the access trends of Embarcadero and Montgomery, both in similar urban contexts, displays the importance of infrastructure investment. While a secure 130-space bike station was installed at Embarcadero, Montgomery received no investment in bicycle infrastructure. Biking was up 1.4 percentage points at Embarcadero, and down almost 0.8 points at Montgomery. This trend possibly represents a shift in riders between two adjacent stations due to the presence of secure bicycle parking; between 1998 and 2008 Montgomery experienced a decrease of 28 daily bike riders and Embarcadero experienced an increase of 75, while total daily ridership increased at both stations over the same ten-year period.

Table 7: Station Bicycle Mode Share by Level of Infrastructure Investment

Infrastructure improvement level*	Number of stations	Avg 2008 bike mode share	Avg % point change in bike mode share (1998-2008)
High	11	6.1%	+2.4%
Medium	22	3.1%	+0.9%
Low	7	1.3%	+0.0%
None	2	1.9%	+0.3%

* Improvement levels defined as follows: High = 100+ new spaces installed and/or attended bike station; Medium = between 30 and 100 new spaces installed; Low = fewer than 30 new spaces installed

Source: BART Station Profile Survey (1998) and BART Station Profile Survey (2008)

The amount of secure bicycle parking, such as keyed or electronic lockers or attended bike stations, in communities with average or above-average rates of bicycling, may be an even greater determinant of increasing bicycle access rates than the quantity of other types of parking. Indeed, the three stations at which secure bike stations were added between 1998 and 2008 (Fruitvale, Downtown Berkeley and Embarcadero) all saw large increases in access via bicycle (5.6, 4.0 and 1.4 percentage points respectively), while the Fremont station, even with the installation of 121 bike racks, saw a 0.6 percentage point decrease in bicycle access (Tables 2 and 4). The most popular stated parking choice of all online survey respondents in both groups was attended bike stations.

Onboard bicycle access

A perceived lack of safe, secure parking may have two results: it can reduce the number of passengers who bike to stations, and it can increase the number of passengers who bring their bikes onboard trains to avoid parking at the origin station. When this plan was published in 2012, over half of passengers systemwide brought their standard size bike onboard a train and more passengers at three-quarters of stations brought their bikes onboard than parked at the station (see Table 8). Twenty-five percent of general online survey respondents and 28% of cycling respondents who bring their bikes onboard trains say they do so because of a lack of secure parking at their origin stations.[9]

> *A perceived lack of safe, secure parking can reduce the number of passengers who bike to stations, while increasing the number of passengers who bring their bikes onboard trains to avoid parking at the home station.*

The 2011 online survey—which shows that 54% of respondents bring their bike onboard—corroborates this story. Although some passengers may bring their bike onboard because they need it to reach their final destination (see First/Last Mile section, below), as multiple focus group participants expressed, many bring their bikes onboard because they do not feel safe leaving them at their origin station. And recent reporting shows that thefts have risen 20% since 2006, with half of the thefts occurring at eight East Bay stations. A common remark from focus group attendees, who for the most part did not cite a need for the bicycle on the destination end of their trip, was that, if there are signs of bicycle theft or general station conditions are perceived to be unsafe, it is unlikely that many will opt to park their bicycles at BART. Furthermore, if passengers feel that the facility in which they park their bicycle is safe, they will be less inclined to take it onboard.

In 2011, BART commissioned a survey of bike station users at the system's two attended bicycle stations: Downtown Berkeley and Fruitvale stations. Over 20% of respondents said they would bring their bike onboard the train if they didn't have access to the safe and secure bike parking that bike stations provide. With one exception, all survey respondents said that they were "very satisfied" with the bike station parking facilities, "because I know my bike is safe," to quote one respondent.

[9] Between 2006 and 2011, reported bike thefts increased 20%, totaling over 2,600. Eight stations - Walnut Creek, Pleasant Hill/Contra Costa Centre, Dublin/Pleasanton, Ashby, Fremont, North Berkeley, MacArthur and Concord - accounted for half of the thefts. *Source: http://californiawatch.org/data/bike-thefts-bart-stations, 2012*

> *Over 20% of bike station users surveyed said they would bring their bike onboard the train if they didn't have access to the safe and secure bike parking that bike stations provide.*

Although BART passengers bring their bikes aboard trains more frequently than they park them at the station, many more BART trips would likely begin with a bicycle trip were it not for BART's ban on bringing bicycles onboard train cars during specified "blackout periods." The times during which bicycles cannot be brought onboard occur in the peak direction during the peak morning and afternoon commute periods. BART passengers who consider themselves to be cyclists, as well as the general public, rate the inability to bring their bikes onboard trains during commute hours as the number one deterrent to bicycling to BART. Nonetheless, BART staff consider these blackout periods necessary to avoid potential conflicts in crowded trains between standing patrons and bicycles, as well as to ensure the safety of passengers waiting on busy platforms. Over a decade ago, BART used a 1.1 load factor (i.e., 1.1 passenger per seat ratio) to define blackout periods, based on an analysis of actual passenger loads at one point in time. Passengers with bicycles are not allowed on route segments that had a greater load factor at that time. In general, the bicycle blackout period covers weekdays 7:00 to 9:00 am and 4:30 to 6:45 pm, with the exact times varying by station because the blackout schedule prohibits bikes on certain train runs between certain stops.[10] There are no blackout periods on the Richmond-Fremont line. In addition to potential passenger/bicycle conflicts inside trains, BART also seeks to avoid overcrowded platforms by instituting the following station-specific rules, which prevent passengers with bicycles from boarding to ride in the permitted non-peak direction:

- During morning commute hours, bikes are allowed in the Embarcadero Station only for trips to the East Bay.
- During evening commute hours, bicyclists traveling from the East Bay to San Francisco must exit at the Embarcadero Station.
- Bikes cannot enter or exit 12th or 19th Street Oakland stations on weekdays during the morning or evening commute periods.

> *Although BART passengers bring their bikes aboard trains more frequently than they park them at the station, many more BART trips would likely begin with a bicycle trip were it not for the blackout periods.*

Many focus group participants cited the blackout periods as being a strong deterrent to accessing BART by bicycle. Some stated that it wasn't feasible for them to avoid them by modifying their work schedules, while others said that the ban places an extra burden on figuring out which train they can or cannot ride. Focus group participants cited the blackout ban as an example of a non-bike supportive policy because it requires riders to plan ahead to a much greater extent than other passengers. Interestingly, 43% of BART's 2008 Customer Satisfaction Survey respondents (i.e., the general riding public, which includes on average 4% riders who accessed the station by bike) would like to maintain the bike blackout ban as is, while 24% support allowing cyclists on more trains.

[10] Most comparable U.S. transit systems ban bicycles system-wide during particular blocks of time. While more complex to understand, BART's train- and line specific blackout periods minimize the amount of time bicycles are prohibited on a given train.

Table 8: Bicycles parked versus bicycles brought onboard trains, by station

	Parked bike at station	Brought standard bike on train	Brought folding bike on train*	Brought any bike on train
12 Street/Oakland	37%	56%	6%	63%
16th Street Mission	27%	70%	3%	73%
19th Street/Oakland	42%	48%	10%	58%
24th Street Mission	50%	46%	4%	50%
Ashby	44%	48%	8%	56%
Balboa Park	15%	85%	0%	85%
Bay Fair	27%	73%	0%	73%
Castro Valley	16%	72%	11%	84%
Civic Center	40%	56%	4%	60%
Coliseum	50%	50%	0%	50%
Colma	48%	52%	0%	52%
Concord	45%	31%	24%	55%
Daly City	26%	56%	19%	74%
Downtown Berkeley	59%	40%	1%	41%
Dublin/ Pleasanton	79%	21%	0%	21%
El Cerrito Del Norte	40%	44%	17%	60%
El Cerrito Plaza	62%	35%	4%	38%
Embarcadero	11%	87%	2%	89%
Fremont	42%	49%	9%	58%
Fruitvale	44%	53%	3%	56%
Glen Park	42%	36%	22%	58%
Hayward	0%	89%	11%	100%
Lafayette	73%	27%	0%	27%
Lake Merritt	22%	74%	4%	78%
MacArthur	38%	53%	9%	62%
Millbrae	56%	44%	0%	44%
Montgomery	22%	78%	0%	78%
North Berkeley	55%	42%	3%	45%
North Concord/ Martinez	50%	50%	0%	50%
Orinda	66%	34%	0%	34%
Pittsburg/ Bay Point	32%	41%	27%	68%
Pleasant Hill	75%	14%	11%	25%
Powell	15%	85%	0%	85%
Richmond	25%	67%	7%	75%
Rockridge	35%	65%	0%	65%
San Bruno	44%	56%	0%	56%

	Parked bike at station	Brought standard bike on train	Brought folding bike on train*	Brought any bike on train
San Leandro	32%	52%	16%	68%
South Hayward	14%	72%	14%	86%
South San Francisco	58%	42%	0%	42%
Union City	21%	79%	0%	79%
Walnut Creek	85%	15%	0%	15%
West Oakland	38%	49%	13%	62%
System-wide	**41%**	**53%**	**6%**	**59%**

* Folding bikes are reported separately since, unlike standard bicycles, they can be brought onboard trains during commute periods.
Note: Sample sizes at many stations were low, so margin of error for individual stations is high.
Shading indicates more passengers brought a bike aboard a train than parked at station.
Source: 2008 Station Profile Study

The BART system originally prohibited bicycles aboard all trains so rail cars (and stations) were not designed with bikes in mind. Most trains currently have no dedicated space reserved for bicycles and none provide special seating for people with bicycles, so passengers with bikes often need to stand and hold their bike, while trying not to block the doors for other passengers. According to focus group feedback, this awkwardness deters some passengers from bringing their bikes onboard trains because it's uncomfortable and they don't want to burden other passengers. Seven percent of online survey-takers who do not regularly ride to BART indicated that not enough space for bikes on train cars was the most significant obstacle to using their bike to access BART.

In an attempt to accommodate increasing numbers of passengers with luggage, wheelchairs, strollers and bicycles, all BART trains are being retrofitted. Seats near the car doors are being removed to make space for bikes and other large objects. Experimental "bike spaces" have been added to some cars, which provide a dedicated space adjacent to one set of train doors specifically for bicycles and, using bold graphics, inform other passengers that bicycles are allowed on trains (see photo). Nonetheless, with regional investment in BART station area development (aka Priority Development Areas) will likely come increasing ridership. Therefore, while adjustments to the blackout periods to accurately match current passenger loading may be possible, wholesale elimination of this policy is extremely unlikely.

Transporting bicycles through stations

At stations that provide auto parking, the first challenge passengers with bicycles often encounter on BART property is the design of those lots. Without dedicated bicycle entrances or lanes, cyclists must contend with drivers who can be more focused on finding a scarce parking spot and making their train than sharing access ways with bikes. An almost uniform absence of wayfinding signage directing cyclists to bike parking, fare gates, and platforms

compounds this parking lot experience (see Communication section, below).

> *Without dedicated bicycle entrances to or lanes in BART car parking lots, cyclists must contend with drivers who can be more focused on finding a scarce parking spot and making their train than sharing access ways with bikes.*

Once inside the station, BART does not allow passengers to bring their bicycles on station escalators out of space and safety concerns, which leaves carrying them on staircases or using an elevator as the only options for getting a bicycle between the fare gates and train (and, in some cases, to bike parking). Carrying a bicycle up or down stairs can be challenging, particularly for children, elderly, and disabled cyclists. Limited elevator service (which is often needed by passengers with disabilities and/or baby strollers), elevators that are often located outside the fare gates (requiring an extra trip to pay one's fare) and a majority of fare gates that are too narrow for a bicycle to pass through can also keep BART stations from feeling welcoming to bicycling passengers.

Three recent improvements have improved all of these situations:

Accessible fare gates

BART has installed wider fare gates—designed to accommodate wheelchairs, luggage and bicycles—at each station, which allow cyclists to avoid the two-step station entry and exit process whereby they exit through the emergency/disabled access swing gate with their bike, re-enter, then exit through a fare gate to pay their fare as usual. Cyclists complain, however, that these gates are not timed to remain open sufficiently long for passengers with bikes, strollers or luggage to pass through before they close. The accessible gate at the Ashby station is cited as one that works well and could be used as a model throughout the BART system.

Stairway channels

A stairway channel is a smooth channel along the edge of a stairway that is used to roll a bicycle up and down the stairs. Since bicycles are not allowed on escalators, and elevators are often not conveniently located, stair channels are an enhancement that makes taking bikes up and down stairs more manageable. BART installed stairway channels at the 16th/Mission station in 2007. A subsequent survey administered to cyclists at that station indicated that about 40% of bicyclists entering the station (downstairs) use the stairway channel, while about 43% use the it to exit the station (upstairs), about the same as the rate cyclists now use stairways at that station, but much higher than elevator or escalator utilization rates.[11] Consistent with these findings, about 45% of online survey respondents who have used this stairway channel reported that it is the most convenient way to transport their bike between levels at the 16th Street station, and about the same percentage reported that carrying their bike up or down the stairs was most convenient for them.

Escalator policy

Although passengers who bring their bicycles onboard trains want to be able to use the escalators, even if only during uncongested periods, due to safety and liability concerns, bicycles are prohibited on escalators throughout the BART system. During the

[11] 16th and Mission St. BART Station Bicycle Access Survey, BART Customer Access Dept., September 2007.

development of this plan, BART Board members asked staff to look into lifting the ban, and members of the External Technical Advisory Committee that reviewed early drafts of this BART Bicycle Plan also voiced their support for reconsideration of the policy (see Goal & Strategies and Recommendations chapters). There are currently no immediate plans to change this policy.

Communication

Beyond policies that govern bicycle access within BART stations and on trains, and facilities that accommodate them, passengers and bicycle advocates alike cite polite and consistent communication of BART bicycle policies as essential for passengers with bicycles to feel truly welcomed by the system. Measures such as posting blackout periods on fare gates, train schedules and electronic message signs; identifying bicycle-accessible (and -prohibited) cars; and clearly signing bicycle parking locations, all help communicate rules so all passengers understand the rights of and restrictions on passengers with bicycles.

> *Polite and consistent communication of BART bicycle policies is essential for passengers with bicycles to feel truly welcomed by the system.*

Another dimension of communication is enforcement of bicycle-related rules by station agents, train operators and BART police. The consistency and tone of communication with passengers regarding bicycle storage onboard trains is critical both to maintain a welcoming attitude, even in the face of prohibiting a behavior, and to educate cyclists and other passengers about the rules. Focus group participants, advocates, and online survey respondents cite frequent cases of station agents ignoring the escalator prohibition. When one train operator refuses to depart a station until a bicyclist switches cars, while another in the same situation says nothing, all passengers—not just passengers with bicycles—are left confused.

Wayfinding signage—to stations, bicycle parking, elevators and to local destinations—helps passengers with bicycles negotiate the BART system smoothly. Some stations, such as Bay Fair, Millbrae, 24th Street Mission, 16th Street Mission, Coliseum, Richmond, San Bruno, Colma, South San Francisco, Balboa Park, and Lafayette, have minimal or no directions leading passengers to bicycle facilities, while others, such as Ashby and Pleasant Hill are cited as having good bike-specific wayfinding.

Automobile parking

In addition to bicycle-oriented infrastructure improvements, how automobiles are accommodated at a particular station also has a profound impact on bicycle access rates. According to Focus Group participants, BART's increasingly full parking lots motivate some passengers to bike to the station. Pricing policies may also help explain the increase in passengers accessing BART stations by bicycle. Between the 1998 and 2008 Station Profile Studies, BART began charging for automobile parking at 18 of its 44 stations (an additional eight have instituted paid parking since 2008, for a total of 26 today). There was an increase in access via bicycle during this period at all but two of the 18 stations (terminus stations Fremont and Dublin/Pleasanton). On average, those stations that began charging for auto parking between 1998 and 2008 experienced the largest increases in access via bicycle. The stations with large quantities of free parking tend to have the lowest rates of non-car access. Table 9 shows BART stations that began charging for automobile parking between 1998 and 2008 and their corresponding changes in access via bicycle.

Table 9: BART stations that charge for auto parking

Station	Daily parking fee	Year parking fee implemented	Absolute change in bike access 1998-2008
Ashby	$1	2006	4.4%
Colma	$2	2003	0.7%
Daly City	$2	2003	0.6%
Dublin/Pleasanton	$1	2006	-0.5%
El Cerrito Plaza	$1	2007	2.8%
Fremont	$1	2007	-0.6%
Fruitvale	$1	2005	5.6%
Lafayette	$1	2006	0.5%
Lake Merritt	$1	2005	2.8%
Mac Arthur	$1	2005	3.8%
Millbrae	$1	2003	N/A
North Berkeley	$1	2006	3.0%
Orinda	$1	2006	0.3%
Rockridge	$1	2005	1.7%
Walnut Creek	$1	2006	0.0%
San Bruno	$1	2003	N/A
South San Francisco	$1	2003	N/A
West Oakland	$5	2005	3.9%

Source: BART Station Profile Study (1998 and 2008)

First and last mile

Measures to encourage BART passengers to access stations by bicycle are not limited to those on BART property or under the agency's control. In fact, the "last (or first) mile" is cited, in the national literature and by focus group participants alike, as one of the biggest barriers to bicycling to public transit. Many stations are not well served by bicycle paths, lanes or other facilities that provide safe and continuous bicycle access. Challenges include gaps in regional bicycle path systems and multi-lane, high-speed arterials leading to BART, which, even where bicycle lanes are present, can be intimidating and even unsafe for cyclists to negotiate. According to the 2008 Station Profile Study, the median distance from BART passengers' homes to their origin BART station is 1.39 miles, so improving bicycle access on the first and last miles is likely to go far to encourage passengers to bike to BART.

> *The "last (or first) mile" is cited, in the national literature and by focus group participants alike, as one of the biggest barriers to bicycling to public transit.*

Other factors

Other changes that are out of the scope of this plan, but also likely contributed to increasing levels of bicycle access to BART include:

- Rapid expansion of the Bay Area economy, peaking in late 2000, followed by an equally dramatic economic contraction and subsequent recovery.
- A real estate boom, peaking in late 2006, followed by a housing downturn.
- A national recession beginning around March 2008.
- An increase in construction of denser housing in urban areas, including transit-oriented developments located within walking distance of many BART stations.
- A dramatic increase in gasoline prices, peaking in the summer of 2008.

3 | Goal and Strategies

Introduction

The Goal

The 2002 BART Bicycle Access and Parking Plan had a two-part goal: Enhance the attractiveness of the bicycle as an access mode and thereby increase the bicycle access mode share. The targets for this goal aimed to increase the bicycle access share from 2.5% in 2002 to 3.0% by 2010. In the last decade, BART shattered this bicycle access target, reaching 4.1% in 2010, when approximately 14,000 passengers rode a bicycle to BART on the average weekday.[12]

Table 10: Access mode from home to BART

	Percent
Walked	31.9
Drove alone	28.6
Bus/transit	15.9
Dropped off	11.5
Carpooled	5.5
Bicycle	4.1
Other	2.4
Total	**100.0**

Source: 2010 Customer Satisfaction Study

Based on the success of past BART bicycle access improvements and the growth in popularity of bicycle travel throughout the BART service area, and, consistent with the regional Plan Bay Area[13] effort, this plan sets a systemwide goal of doubling the 2010 bike access target by 2022 – in other words, striving for 8% of BART passengers to reach stations by bike by 2022.

This translates to an increase from approximately 14,000 weekday bicycle trips in 2010 to 35,000 in 2022, taking into account planned extension stations and projected ridership increases (see box). Given the aggressive level of improvements envisioned in this plan and the generally higher rate of bicycling in many of the communities served by BART, a systemwide bicycle access mode share of 8% by 2022 is ambitious, but certainly attainable, assuming resources are available to implement the strategies called for in this plan.

> *The goal of this plan is to double BART bicycle access, to 8% of all trips, by 2022.*

Objectives & Strategies

In order to achieve the transformational goal of increasing bicycle access mode share to 8% by 2022, BART must implement a diversity of strategies that collectively address the factors that influence passengers' decisions whether or not to access BART by bicycle. The strategies outlined in this chapter seek to create a system that embraces the bicycle as the greenest vehicle access mode, which is the least expensive and most space-efficient to accommodate. Many of these strategies also support BART's transit-oriented development policy and accessibility goals for passengers with disabilities.

Throughout this chapter, it is important to keep in mind that there are two distinct kinds of passengers who access BART by bicycle: those who park their bicycle at the station and those who bring their bicycle onboard. The priority of this plan is the first, given that there are no plans over the ten-year horizon of this plan to appreciably increase peak period train capacity.

[12] BART Customer Satisfaction Surveys

[13] Plan Bay Area is San Francisco Bay Area's region-wide planning effort to produce a more integrated land-use/transportation plan for the nine Bay Area counties. The effort prioritizes investment in development that capitalizes on rail nodes, such as BART stations, and that facilitates biking and walking to transit.

The numbers

BART tracks statistics of passengers riding trains in terms of "trips," a one way journey from origin to destination. A typical passenger takes two trips per day, one from home and a second reverse trip later in the day. Achieving the plan goal of doubling bicycle access will mean accommodating the bicycles used for 35,000 one-way trips per weekday.

If all of these bikes are parked at stations, then half the number of trips, or 17,500 spaces, would be needed. Subtracting the system's existing bike parking supply of 4,500 spaces (see Table 4), leaves a deficit of 13,000 needed bicycle parking spaces, almost a threefold increase.

This number is surely an overestimate of needed parking since many passengers bring their bicycles onboard the train – 59% of trips in 2010 (53% standard bikes and 6% folding bikes). Therefore, in order to project the number of needed bike parking spaces, we need to estimate how many people will bring their bicycles aboard trains. Assuming the current rate of passengers parking at stations of 41%, about 7,200 bike parking spaces would be needed. This is likely a low estimate because it means that 53%, or 18,500, standard bikes would be brought onboard trains, about 11,000 more than when this plan was published. Although trains at that time had some excess capacity for bikes, and the fleet planned for roll-out beginning in 2017 may allow for longer trains, which will accommodate more bicycles, it is unlikely BART will have space for 11,000 more onboard bicycles.

A more realistic assumption would be that, rather than 59% of passengers bringing their bicycles onboard perhaps 40% (30% standard and 10% folding) would do so. This scenario would mean parking about 10,500 bikes or 6,000 more than the number of spaces available when this plan was published.

2010 and Projected 2022 parked & onboard bicycles

		#	%
2010 Typical Weekday BART Trips		350,000	
Home-based Bike Access Trips		14,000	4%
Parked at station (includes turnover)		2,870	41%
Standard bike on-board		7,420	53%
Folding bike on-board		840	6%
			100%
2022 Estimated Weekday BART Trips		438,000	
Home-based Bike Access Trips		35,000	8%
Assuming same park/onboard split as 2010			
Parked at station		7,200	41%
Full size bike on-board		18,500	53%
Folding bike on-board		2,100	6%
	Total	27,800	100%
Assuming 40% bikes brought onboard			
Parked at station		10,500	60%
Full size bike on-board		10,500	30%
Folding bike on-board		3,500	10%
	Total	24,500	100%

Onboard access is also important, though, to passengers who need their bicycle on the destination end of their trip or who don't feel secure leaving it at their origin station, and a majority of bicycle-related customer comments received by BART each month fall into this category. For these passengers, the plan includes strategies that improve onboard bike access and increase options for secure overnight storage and even bicycle rental at stations. Of course, strategies that will improve conditions for cyclists as they approach the station, enter the fare gates, and board the train will also make leaving the station with a bike easier and more convenient.

❶ Cyclist Circulation

Improve station circulation for passengers with bicycles

Once on BART property, how passengers with bicycles are greeted and accommodated at bicycle parking and directed to preferred passageways through fare gates and beyond, communicate to all passengers the bicycle's role in BART's access hierarchy. Other than pedestrians, which all passengers are at some point in their journey, cars are

currently king at most BART stations. Together, the strategies outlined in this section seek to raise the visibility and importance of bicycle access within stations throughout the BART system. Cyclist Circulation strategies address the facilities that passengers with bicycles use to access, move within and depart from BART stations.

> *Once on BART property, how passengers with bicycles are greeted and accommodated communicate to all passengers the bicycle's role in BART's access hierarchy.*

1.1 | Develop and install wayfinding signage

One of the most basic ways to encourage bicycling to transit is a clearly-communicated wayfinding system. This includes guidance regarding the safest and most direct routes to each station, indication of preferred bike routes through BART property (e.g., colored pavement), the best station and parking lot entrances for bicycles, and directions to bike parking and various means of vertical circulation at each station. A consistent, streamlined system of wayfinding, especially at stations with confusing layouts and obscure bicycle parking locations, could help clarify where safe bike routes and secure bike parking are located. Distinct signage and pavement markings unique to bicycles (e.g. a constant color and a clear bicycle symbol) would increase predictability, access and efficiency for passengers at all stations. BART could also use this directional signage on bicycle parking facilities, accessible fare gates, and bicycle priority-areas on train cars.

Capitalizing on two related efforts will help put this strategy into practice. In 2011, MTC established a new wayfinding program, being implemented by BART. The effort includes new signage design, which was first rolled out in downtown San Francisco and Ashby stations. MTC's Hub Signage Program, a regional transit information display program that will include 11 BART stations, presents another opportunity to improve the presentation of the system's bicycle-related information.

1.2 | Optimize routes between surrounding network and fare gates

The first encounter cycling passengers have with BART is the transition zone between the surrounding bicycle network and the fare gates. Making that connection clear and safe for cyclists would communicate to all passengers the importance of bicycles, while greatly improving cyclists' experience accessing BART, especially in parking lots where vehicular conflicts are possible. Station perimeter routes with dedicated rights-of-way for cyclists, curb cuts where bicycle parking is adjacent to the sidewalk, and bikeways that are as direct as possible without creating conflicts with pedestrians will help achieve Objective #1, Cyclist Circulation.

1.3 | Evaluate and install stairway channels

All passengers need to move vertically at some point in their BART voyage, between the street and concourse and/or between the concourse and platform. This and the following two strategies address this critical component of many BART trips, particularly for passengers assisted with wheels, including wheelchairs, luggage and bicycles.

Installing stairway channels beyond the locations of the system's three existing sets, at 16th Street, Downtown Berkeley and Lafayette stations, would make carrying one's bicycle on BART's staircases easier and safer for many passengers. These concrete (or metal) mini-ramps are cut into or built onto the sides of existing staircases beneath the handrail and allow passengers to roll their bicycles as they walk up or down the stairs. Preliminary reports indicate that

about half of passengers with bicycles use the 16th Street facilities, while half prefer to carry their bicycles or use the elevator or escalator (against BART policy; see Strategy 1.4).

Given the high cost of stairway channels ($100,000/stairway), the efficacy, awareness, design and desirability of the channels at 16th Street station should be studied further. If they're found to be a worthwhile investment, criteria will be needed to determine which staircase(s) to prioritize for retrofit. Including stairway channels in BART's systemwide Facility Standards would ensure their construction at new stations.

1.4 | Revisit bicycles on escalators policy

Since carrying bicycles on stairways can be a challenge and elevators aren't always available or inviting, passengers sometimes choose to bring their bicycles on escalators, against BART policy. Although no U.S. transit agency allows bicycles on escalators, policies permitting them are in effect internationally. BART staff has reevaluated the current escalator policy and has concluded that exposing the agency to the liability of an accident occurring as a result of dropping a bicycle on an escalator is not worth the increased convenience eliminating this ban would have for some passengers. Nonetheless, further analysis, as well as a study of policies employed elsewhere, would help inform BART's long-term policy on this issue.

1.5 | Clean elevators regularly

The slowness and lack of cleanliness in elevators, and the perception that they are unmaintained, has kept many passengers from using them. BART has increased the frequency of elevator-cleaning and monitoring, but there still is room for improvement. This investment would improve the options and safety for passengers with bicycles, as well as for persons with disabilities, families with strollers and others.

1.6 | Install additional ADA-accessible fare gates

BART has already made significant improvements to fare gates with the addition of ADA-accessible gates at some entrances, which make passengers with disabilities, strollers, luggage and bicycles much more visibly welcome into the BART system. However, not all entrances to the system are equipped with these gates. Adding ADA-accessible gates at each entrance to every station would increase ease of access and predictability for these passengers, discourage pushing bicycles and other large items through narrow fare gates, and distribute slower-moving passengers among multiple locations. Timing the fare gates to allow all users through at a comfortable pace would help prevent them from getting caught, which can be a painful experience. Given their high capital and installation cost, however, investment in ADA-accessible fare gates should be weighed against other bicycle-related purchases, while taking into account the mutual benefit of these gates to persons with disabilities and other passengers.

1.7 | Install ADA-accessible fare gates adjacent to elevators

Due to the frequent placement of elevators outside of the fare gates, at many stations throughout the BART system, carrying one's bicycle on the elevator – not to mention using a wheelchair – often requires a repetitive trip through them. ADA-accessible fare gates near elevators are one more way BART can communicate a welcome-ness to passengers with bikes, as well as those with disabilities. A review of the routes these passengers must take to access each station, enter the fare gates and reach the platform would identify the stations that could most benefit from this strategy, and would be mutually supportive of BART's ADA access goals.

> *Providing plentiful secure and convenient bike parking is the most effective tool BART has to convince as many passengers as possible to leave their bicycles at the station, rather than bringing them onboard.*

❷ Plentiful Parking

Create world-class bicycle parking facilities

Bicycle parking is the most visible, symbolic and arguably the most important component of the BART system in terms of its potential to encourage passengers to access stations by bike. Bicycle parking provides an opportunity for the agency to make a bold statement to all passengers about the importance of bicycles as an access mode. Providing plentiful secure

and convenient bike parking is also the most effective tool BART has to convince as many passengers as possible to leave their bicycles at the station, rather than bringing them onboard. The bicycle parking strategies that correspond to this objective address the barriers to bicycle parking passengers currently face, including risks of theft and weather and to personal safety.

2.1 | Provide adequate bicycle parking of each type

Adequate bicycle parking is essential to increasing bicycle access to BART. The BART Bicycle Investment Tool will help determine the amount and type (e.g. racks, lockers or station, sheltered from rain and the sun, etc.) of parking recommended for each station, consistent with Association of Pedestrian and Bicycle Professional (APBP) standards. As important as ample quantities of parking are the station-specific location decisions for each investment. Bicycle parking in the paid area and along other visible, well-traveled pathways will always be more secure than parking in more isolated parts of the station (see Existing Conditions chapter).

2.2 | Light all bicycle parking areas

Lighting in bicycle parking areas will increase the security of passengers and their bicycles.

2.3 | Maintain bicycle facilities more frequently

Vandalized bicycles send a clear message to current and potential cyclists that their bicycle would not be safe parked at a BART station. Routinely removing such bikes, at least quarterly, would help convey to thieves and passengers that the system is paying attention to theft and vandalism. Similarly, keeping other bicycle facilities in good repair maximizes the number of bicycles that can be stored at each station, while communicating that BART cares about its passengers' belongings.

2.4 | Allow Clipper payment for bicycle parking

Paying for eLockers and self-serve bicycle stations with Clipper Cards will make the journey simpler and more efficient for passengers using these facilities. Using Clipper Cards would also reduce the number of payment systems BART must manage (see Existing Conditions chapter).

2.5 | Manage eLocker availability through vacancy targets and price variation

Although parking at BART station bicycle racks is free, eLockers charge a nominal fee, meant to discourage passengers from using the eLockers for long-term storage. BART policy allows the rate to be set at between one and seven cents per hour, with each station permitted to have its own rate. Despite the ability to vary eLocker fees, currently BART charges a uniform three cents per hour throughout the system. Beyond adding eLockers where appropriate (see Strategy 2.1), varying pricing to maintain target occupancy levels (e.g. 85%); increasing the hourly rate for higher occupancy levels, perhaps beyond the maximum currently allowable; and publicizing the hourly rates would take advantage of one of their unique features, while improving management of BART's system of electronic lockers.

❸ Beyond BART Boundaries

Help assure great bicycle access beyond BART's boundaries

Although BART does not have authority to make improvements outside of the agency's property, without safe and convenient bicycle routes to each station, the system cannot hope to substantially increase its bicycle access mode share. The strategies in this section seek to optimize BART's impact on changes that increase passengers' ability to access and depart from stations by bicycle.

Without safe and convenient bicycle routes to each station, BART cannot hope to substantially increase its bicycle access mode share.

3.1 | Evaluate and implement bicycle sharing at BART stations

Bicycle sharing is an arrangement whereby a fleet of publicly owned bicycles is available on demand at transit stations and other nearby destinations. These systems are proving to be highly effective at encouraging short bicycle trips in metropolitan areas around the world. Particularly successful applications are with "first/last mile" trips to/from transit stations (see Existing Conditions chapter). Bicycle sharing can allow public transit to be a travel option for people whose destinations are beyond walking distance, but within biking distance of a station. It can also prevent some passengers from having to bring their bicycles onboard trains who do so because they need them on the destination end of their trip. In the BART context, a passenger exiting at a given station would check out a bicycle and ride to their ultimate destination, presumably near another bikeshare station[14], where they would leave the bike until it's time to return to the BART station. Smart card technology allows for automated check-in and -out of bikes and virtually eliminates theft, which plagued early programs. By fall 2012, a one thousand-bicycle Regional Bike Share program will have launched in San Francisco, the Peninsula and San Jose, including bikeshare stations at all the downtown San Francisco BART stations and a likely future expansion to additional BART station areas. Monitoring this program and, if successful, studying and implementing other bicycle sharing pilot programs in collaboration with local agencies and private partners would expand the number of passengers living and working within a short distance of BART who can bike to reach a station.

[14] A bikeshare "station" is composed of one "kiosk" (the ATM-like pay station) and multiple "docks" (which each secure one bicycle).

3.2 | Support local efforts to improve bicycle access to stations

Where BART does not have jurisdiction to make changes – such as on local streets and pathways – supporting local efforts to fund and implement bicycle facilities that serve BART stations would help make these improvements happen. BART assistance could take the form of letters of support and participation in local meetings. Many of these bicycle access improvements may have been included in one of the dozen or so recent MTC and Caltrans-funded Station Area Plans that covered locations near BART stations, including access routes, wayfinding signage, parking at downtown stations or other facilities in local agencies' jurisdiction (see description of Appendix F in the Introduction chapter for a list of these stations). In addition, the East Bay Greenway – a planned 12-mile corridor linking five BART stations in Oakland, San Leandro and Hayward – offers a unique opportunity for BART to work with local jurisdictions to develop this "trails-to-transit" facility on property BART partly owns. A list of needed projects identified in other plans is included in Appendix F; Appendix D contains additional improvements suggested by advocacy groups and countywide bicycle/pedestrian advisory committee members. In addition, there are many opportunities for the agency to leverage private funds to accomplish the shared goal of increasing BART patronage. In particular, large businesses located just past walking distance of a station would need to provide less automobile parking if more employees could bike to work.

3.3 | Create station area maps with recommended bike routes

Local area maps for each station would help make BART passengers' journeys to their final destinations safer and more efficient. The maps could include local bicycle networks, major destinations and bicycle shops in the vicinity of each station. The reverse side of printed maps could provide information on BART bicycle programs and policies. Displaying the maps in each station, providing pocket maps, and posting them online would help expand BART's reach and suggest bicycling to passengers who may not have otherwise considered it.

❹ Bikes on BART

Optimize bicycle accommodations aboard trains

Unlike the previous three objectives, onboard access strategies involve BART operations and car design. This objective acknowledges that passengers sometimes need their bicycle at the destination end of their BART ride and therefore bring it onboard. Regardless of the strategy, clearly communicating to all passengers where, when and how bicycles can be safely and conveniently stored on train cars would help demonstrate the importance BART places on bicycles and on other passengers' right to a grease-free ride.

> *Clearly communicating to all passengers where, when and how bicycles can be stored on train cars would help demonstrate the importance BART places on bicycles and on other passengers' right to a grease-free ride.*

4.1 | Provide space for bicycles in new BART cars

Allocating space specifically for bicycles on the next generation of BART cars communicates welcome-ness to passengers with bicycles and helps prevent bicycles from interfering with other passengers. BART is currently experimenting with bicycle-priority areas in select cars and will be putting into service cars with improved designs beginning in 2017. New car designs at the time this report was written include an extra door on each side – three in total – and a bike-priority area with racks for three bikes near the middle door of every car. A better-designed bicycle-priority area, folding seats and on-board stabilizing mechanisms would assist passengers with bicycles, reduce passenger conflicts, and accommodate bicycles efficiently. In addition to these features, which are currently being pursued by BART, another concept recommended by focus group participants and one of the most common BART customer suggestions is special train cars that prioritize bicycle accommodation by providing more of these amenities than a typical car, similar to Caltrain's bike cars.

4.2 | Evaluate blackout periods

Current blackout periods maximize the time bicycles are allowed on BART trains. As a result, periods vary between stations and can therefore be difficult to remember. Simpler blackout periods would make the policy easier to understand and learn by heart but, if established on a systemwide basis, would also reduce onboard bicycle access at any given station. An evaluation of blackout periods would need to balance these effects, rationalizing the times without reducing onboard access. BART currently publicizes the trains on which bicycles are and are not permitted on all printed and online schedules and on platform electronic destination signs. Whether or not new blackout periods are established, continuing to seek ways to more clearly advertise these rules throughout the BART system, including outside fare gates and on platforms, would provide a better understanding of when bicycles are allowed on trains for all BART staff and passengers.

4.3 | Develop a folding bicycle incentive program

Unlike full-sized bicycles, folding bikes can be carried onboard trains at any time. For passengers who need their bicycle on both ends of their trip, a cost-effective way for BART to encourage this option would be to loan or give away folding bicycles on a promotional basis.

❺ Persuasive Programs

Complement bicycle-supportive policies and facilities with support programs

BART programs that complement bike-supportive policies and investments will increase the effectiveness of all efforts. The programs in this section suggest strategies aimed at BART staff and passengers alike.

> *BART programs that complement bike-supportive policies and investments will increase the effectiveness of all efforts.*

5.1 | Educate passengers and staff on use and benefits of bicycles

Many passengers do not know the full range of resources available for accessing, parking and boarding BART with bicycles. Publishing tips on the use of the system's bicycle facilities and making them widely available through multiple media would help passengers feel more confident about their options. Public campaigns that explain how to best prevent

bike theft, eLocker and bike station use, and how "bikes benefit everyone" are all positive ways to educate and attract more cyclists. Encouraging BART staff to take BART to work, and bike to their home station, would help provide the agency with "experiential knowledge" that will help them better accommodate cycling customers.

5.2 | Improve communications with customers on BART bicycle policies and facilities

Clear, consistent and positive language about BART's bicycle-related policies would make stations safer and circulation easier for all passengers. Pertinent policies include where bicycles can be safely ridden, how best to travel with a bike between BART station levels, and when bikes can be brought onboard trains. Placement at the appropriate decision-making points is as critical as the information itself, including outside fare gates, on the platform Destination Sign System (DSS), at escalator loading areas and at train doors. Continuing to train staff in the use of positive language when communicating BART policies would also improve the customer experience for cyclists. Online information, rules and user guidelines would also reinforce and improve BART's appreciation of how responsible bicycle use can help all passengers. And, since communication works both ways, the ability of passengers to text comments to BART on bike-related issues, such as broken eLockers or bike parts locked to racks for months, would help BART better maintain the system while collecting potentially useful data.

5.3 | Collect access mode data before/after bicycle improvements

This plan and the companion investment tool emphasize bicycle parking in part because it is the facility about which BART has collected the most data. Even so, the absence of bicycle access counts before and after installation of bicycle parking, stairway channels and other bicycle-related facilities prevents more robust analyses. If BART collected this data, there would be more of a basis for particular investments in bicycle infrastructure and programs, which would also help improve the usefulness and accuracy of the Bicycle Investment Tool.

5.4 | Evaluate and increase automobile parking fees

Automobile parking fees reflect the extra service provided to passengers accessing BART by car, yet compared to market rates, most stations undercharge for parking or do not charge at all. As shown in the Existing Conditions chapter, there is a strong correlation between auto parking fees and bicycle access: on average, stations that offer the most free parking have the lowest bicycle access rates, and when stations begin charging for auto parking, more passengers begin to bike there. Market-based parking fees at all stations would encourage passengers to consider alternative means of accessing BART, help manage parking availability, and potentially provide funding for bicycle facilities in the system. Related would be a strategy of evaluating how much bicycle parking could take the place of automobile parking that BART and its private partners replace with transit-oriented development.

5.5 | Participate in more Bike-to-Work day events

Annual Bike-to-Work Day (BTW) events throughout BART's service areas are designed to encourage Bay Area residents to try bicycling to work as an alternative to the single-occupant vehicle. Because combining biking with BART can also replace vehicle trips, BART historically allows Bike-to-Work Day "Energizer Stations" (booths that serve refreshments to BTW Day participants) on BART property. The agency could increase its participation in these events by staffing booths and providing incentives to participants.

5.6 | Fight bicycle theft

Building plentiful, secure bike parking will go a long way toward protecting BART passengers' bicycles. Beyond this infrastructure, tracking theft data more closely, and encouraging passengers to report incidents of theft will help BART staff get a better handle on trends and hot spots. Specific measures include improved reporting forms and databases, so that how and where stolen bikes were locked can be tracked; regular review of security videos; and better communication between BART police, bicycle planning staff and BART's Bicycle Accessibility Task Force. These recommended actions will help BART target sting operations, parking investments, safety campaigns and other theft prevention efforts. These efforts can extend to educating riders on proper locking technique and recording and storing their bicycle's serial number.

5.7 | Update station standards for bicycle facilities

BART's Facilities Standards is a living document that currently includes standards for bicycle facilities. Updating this guide on an ongoing basis will help BART staff evaluate needed improvements at each station and design new stations to the highest standards.

4 | Modeling Future Investment

Introduction

The previous chapter of this plan lays out an ambitious goal and set of strategies aimed at increasing the number and proportion of passengers who reach BART stations by bicycle. These include improving station circulation for passengers with bicycles, creating world-class bicycle parking facilities, optimizing bicycle accommodations aboard trains, helping assure great bicycle access beyond BART's boundaries and developing support programs that complement new bicycle-supportive policies and facility investments.

To be sure, investment in more secure and convenient bicycle parking and other improvements to stations and the bikeways leading to them will increase the visibility and importance of cyclists to the system, presumably increasing the number of passengers who choose to travel to BART by bicycle. Less clear is the specific impact a given investment can be expected to have. In other words, with a given amount of funding, how and at what stations should BART invest to generate the most new riders and encourage the most existing drive access passengers to shift to bicycling? Related, what is the effect on access of increasing the number of trains on which bicycles can be brought? Equally important is the ability to compare potential bike-related projects to the same investment in other access modes in order to predict which will generate the most new passengers per dollar, particularly relative to the most popular current BART access mode for home-based trips, the single-occupant automobile.

> *With a given amount of funding, how and at what stations should BART invest to generate the most new riders and encourage the most existing drive access passengers to shift to bicycling?*

An exciting component of this BART Bicycle Plan is a new bicycle access model, developed to help BART and other commuter rail operators predict the effect of an assortment of bicycle-related investments on bicycle access rates, and to compare these investments to the cost of providing automobile parking. Although based primarily on BART data, the model and companion spreadsheet tool are designed to be used and adapted by a broader range of transit operators.

Find the Bicycle Investment Tool at:

http://bart.gov/guide/bikes/investment.aspx

This chapter describes users that could benefit from this spreadsheet tool, its uses, and required inputs and outputs. Appendix G provides a Users' Guide to the tool; and Appenix H describes the model development process, including assumptions and data challenges. While not necessary for using the spreadsheet tool, the background information in Appendix H will be interesting for those wanting to study the groundbreaking process used to develop the model and tool, and will come in handy for practitioners hoping to improve upon this first generation model.

Who should use this tool and why

The typical user of the Bicycle Investment Tool, which employs an Excel spreadsheet interface, is a commuter or urban rail planner wishing to predict the effect of a variety of investments on ridership, access and whether a bike access passenger will park at the station or bring their bike onboard a train. The tool is programmed with specific and detailed information for the BART system as described later in this chapter; however, it is designed to be flexible and easy to use by other rail operators as well. While BART planners can rely on pre-programmed station-specific data collected by BART, other transit operators can also use the tool by categorizing their stations according to the most appropriate BART station "typology" (see Existing Conditions chapter and Table 11).

Table 11: BART station typologies

Station typology	Description	Example BART stations*
Urban	High-ridership with high walk, bike and transit access share. No parking provided. Can be found in downtown or neighborhood business district	12th Street Oakland, Downtown Berkeley, Embarcadero
Urban with parking	Similar to "Urban," but with small parking lots that fill up early. Auto mode share is higher than "Urban."	Ashby, Lake Merritt, North Berkeley
Balanced intermodal	Well-served by transit that serves primarily corridor and local transit. Parking provided, but fills early due to size. Can be found on urban or suburban grid network. Walk access mode share is moderate.	Fruitvale, MacArthur, Rockridge
Intermodal—auto-reliant	Well-served by regional and local transit. Large amounts of parking provided. Can be found on suburban grid or residential area. Walk access share is lower than average.	Daly City, El Cerrito del Norte, Walnut Creek
Auto dependant	Focus on auto-based access. Large station footprint, structured and/or surface parking, and adjacent highway access. Walk and transit access share predominantly below average.	East Dublin/Pleasanton, Lafayette, Pittsburg/Bay Point

* To help determine the most accurate station typology to apply to a given non-BART station, see www.bart.gov/stations/index.aspx for links to more details about each BART station.

BART staff envisions using the tool in at least three ways:

1. **Prioritizing investment:** When opportunities arise to make improvements at a given station, for instance, when other station modifications are being planned, the tool can help identify the best bicycle-related investments. The tool can also help prioritize systemwide investments, like the purchase of hundreds of electronic bike lockers.

2. **Justifying BART funds:** As described later in this chapter, the investment tool can estimate the increased number of passengers arriving at a given station by bike as a result of particular investments. Whether these riders are new to the system or have switched from driving, thereby freeing up costly automobile parking spaces, this shift can represent additional fare revenue, which could be allocated to making the improvements.

3. **Predicting benefits:** Competing for outside grants increasingly relies on the ability to quantify the benefits of the investments for which funding is being sought. These benefits include increased ridership and reduced auto access VMT and

resulting pollutants, all calculations the tool can help develop.

Model inputs and outputs

The Excel spreadsheet tool contains the following seven tabs or worksheets:

1. **Instructions**, including an overview of the Tool's contents and disclaimers
2. **Assumptions and Constraints** of the bicycle access model
3. **Bicycle Parking Facility Costs**, per unit
4. **Bicycle Parking Investments Inputs**, which requires the user to input the information outlined in Table 11 for their investment scenario
5. **Bicycle Parking Investments Summary**, which provides an evaluation of the selected investment scenario as shown in Table 12
6. **Support Strategies**, as described in the Goal and Strategies chapter, which allows the user to select station- and system-level strategies for inclusion in the overall summary page
7. **Overall Summary**, which provides a summary of the bicycle parking investments, associated costs and projected increase in daily bicycle access as shown in Table 12, as well as the selected support strategies

Investment tool inputs

The primary difference between using the Bicycle Investment Tool for the BART system and for other transit operators is the data inputs. While station-specific data is built into the BART model, other transit systems must either use the station typology defaults, manually enter local data or some combination of these two sets of inputs.

In the Bicycle Parking Investments Input tab, all users – whether planning for BART or another rail system – must choose a scenario year (i.e., when the planned improvements would be made) and total budget (capital and annual operating costs). BART planners then select from a pull-down menu of stations that were in operation as of 2012, when this plan was published. Investment tool-users from other systems (and BART analysts looking at extension stations) represent the station being studied by choosing the most comparable BART station typology, whose default input values are the average value of all BART stations of that typology. When local values are known for one or more variables, the user can easily override the average typology value (see Table 11).

Next, a bicycle mode share goal (e.g., 8% for 2022 would be consistent with this plan's goal, although the number will likely vary from station to station) is entered. The tool then populates fields for base year characteristics (nearby population, employment and intersection density, auto and bicycle parking supply, and the percentage of trains serving the station that allow bicycles onboard) – for BART stations, based on actual data; for stations using typologies, based on the average values for BART stations of that typology. Actual base year bicycle parking supply and occupancy is automatically populated for BART stations. Planners at other systems (or BART planners in future years) must enter actual bike parking supply figures; occupancy can revert to default typology averages or be overridden with actual occupancy data.

Finally, the user can experiment by trying various combinations of up to six varieties of bicycle parking[15] that fit within the established capital and annual operating budgets. Checklists of other recommended station-specific investments are included on subsequent spreadsheet tabs, but because BART does not have data on their potential effect on ridership, these strategies are included in a more qualitative manner than parking-related investments. See Table 12 for a list of inputs and Figure 2 for sample screen shots of the tool's input fields. See Appendix G for a complete User's Guide to the investment tool.

[15] Parking options include bicycle racks inside and outside the fare gates, keyed and electronic lockers, attended and self-serve bike stations, and bicycle cages. See Existing Conditions chapter Table 3 for a description of each, with the exception of bicycle cages – either locked or unlocked enclosed areas containing a collection of bicycle racks – which don't currently exist in the BART system.

Table 12: Inputs to Bicycle Investment Tool

- Scenario year
- Bicycle parking facility costs (can use default)
- Investment budget (capital and operating)
- BART station or station typology
- Mode share goal for scenario year (can use default)
- Base year station area characteristics (can use default)
- Total station ridership (can use default)
- Base year bicycle parking supply & occupancy by facility type (can use default for occupancy)
- Supporting bicycle strategies

Investment tool outputs

Once station inputs have been entered (either by using the automatic typology-based or local values), the Bicycle Investment Tool functions identically for stations outside the BART system as for BART's own stations.

The user can experiment with different values for the number of bicycle parking spaces of each type. Each time a promising scenario is created, the Bicycle Parking Investments Summary tab shows its ratio of short-term to long-term parking and predicted effect on the number of weekday passengers that can be expected to access a given station by bike. This number is then split into those who are projected to park at the station and those who may instead bring their bikes onboard a train. The Overall Summary tab also provides much of this information, plus investment cost, cost per rider and return on investment. (See Table 13 and Figure 3).

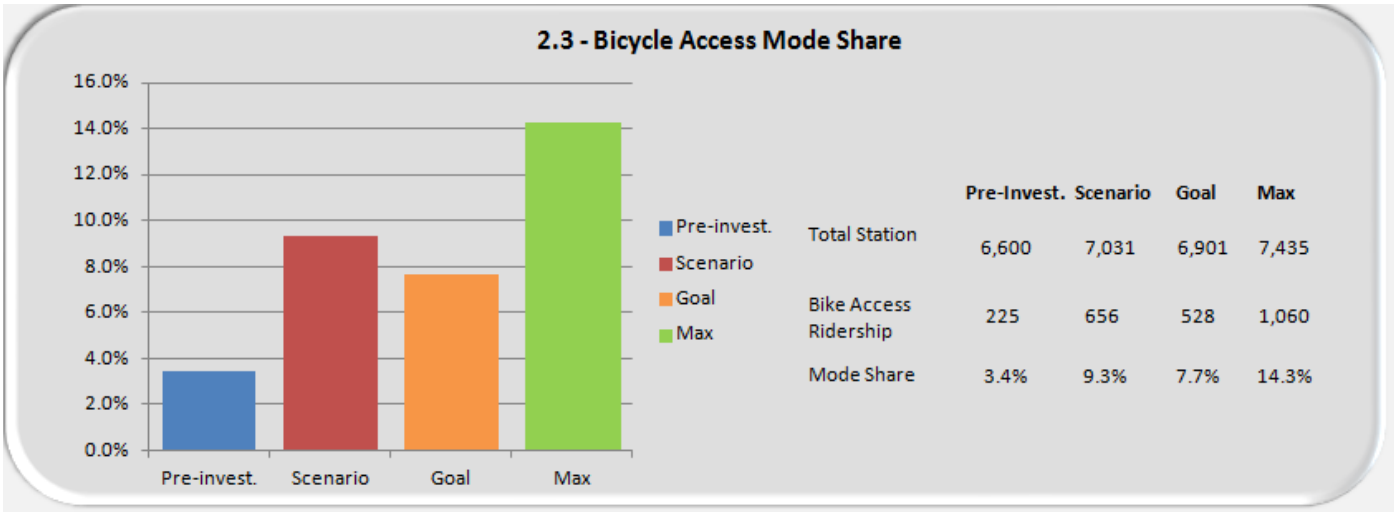
Table 13: Outputs from Bicycle Investment Tool

- Ratio of short-term to long-term bicycle parking
- Daily bicycle access ridership increase by parking investment
- Change in bicycle access mode share
- Number of parked versus onboard bicycles
- Cost of bicycle investments and cost per new bike access passenger
- Return on (bicycle parking) investment

Figure 2: Bicycle Investment Tool – Inputs for Bicycle Parking

Station Area Characteristics	
Population within 1/2 mile radius of station	6,139
Unreserved vehicle parking spaces provided at station	83
Non-blackout percentage	92 %
Bicycle Parking	
Bicycle rack spaces outside fare gates	21
Bicycle rack spaces inside fare gates	0
Keyed locker spaces	0
Electronic locker spaces	32
Self serve bike station spaces	0
Attended bike station spaces	0
Security of bicycle parking rating	0.9
Lighting of bicycle parking rating	1.2

Figure 3: Bicycle Investment Tool – Sample Outputs



	Pre-Invest.	Scenario	Goal	Max
Total Station	6,600	7,031	6,901	7,435
Bike Access Ridership	225	656	528	1,060
Mode Share	3.4%	9.3%	7.7%	14.3%

	Pre-Investment	Scenario	Goal
Daily Bike Access Ridership	225	656	528
Daily Bike Access Mode Share	3.4%	9.3%	7.7%

Investment Type	ROI (Capital + annual operating cost per new daily rider)
Bicycle Parking Investments for this scenario	$1,720
Auto parking investments (surface parking)	$7,700
Auto parking investments (structure parking)	$41,900

Model and tool context

As pioneering as the BART bicycle investment model and tool are, it is important to understand that, in the BART system at least, their output will be but one mechanism among many bicycle-related decision-making factors. This list includes opportunities presented by other projects, such as station renovations; grants aimed at a particular type of investment or geographic location; and, of course, observed demand at stations where existing facilities are routinely oversubscribed.

5 | Recommendations

Introduction

To double bicycle access by 2022, BART must implement a diversity of strategies expected to most effectively influence passengers' decisions to access BART by bike. The Goal & Strategies chapter catalogued a set of potential strategies for accomplishing the goal of achieving 8% bike access by 2022 and divided them into five objectives:

1. **Cyclist Circulation:** Improve station circulation for passengers with bicycles
2. **Plentiful Parking:** Create world-class bicycle parking facilities
3. **Beyond BART Boundaries:** Help assure great bicycle access beyond BART's boundaries
4. **Bikes on BART:** Optimize bicycle accommodations aboard trains
5. **Persuasive Programs:** Complement bicycle-supportive policies and facilities with support programs

The focus of this chapter is on the subset of strategies presented in the Goal & Strategies chapter expected to be most effective at encouraging passengers to travel to BART by bike, including those using current and future extension stations. This narrative explains why each was prioritized, and discusses how, together, these strategies will help achieve the ambitious goal of doubling bicycle access to BART by 2022. These recommended strategies will also improve the experience for other passengers, including persons with disabilities; encourage more passengers to try bicycling to BART, thereby freeing up scarce auto parking; and potentially increase BART ridership and revenue.

Each recommendation applies either systemwide or just to certain stations. Systemwide recommendations include strategies regarding blackout periods, train car design and public campaigns to make the system more welcoming of cyclists, as well as other strategies, such as wayfinding design, escalator policy and elevator maintenance, that apply to every station in the system. For station-specific strategies, BART will need to consider the unique needs and opportunities of each one and identify the mix of strategies that are most likely to attract more passengers to access that station by bicycle. In certain situations and at certain stations some of the recommended strategies will be more valuable than others; therefore, they are not prioritized. Unlike BART's original stations, which were not planned to accommodate bicycles, extension stations provide a particularly good opportunity to design and install excellent bicycle parking before the stations open. The investment tool described in the previous chapter can help estimate an appropriate level of parking of each type at these stations.

Criteria for Recommended Strategies

Each of the strategies in this chapter is recommended based on an array of criteria, which ask questions about its importance to a "bike-friendly" transit system, ease of implementation, effectiveness at attracting new cyclists and cost. These criteria are summarized below.

How important is the strategy to a bike-friendly transit system?

The first criterion for selecting the strategies recommended in this chapter was a rather subjective determination of the basic measures a transit system striving to be considered "bicycle-friendly" should take. All strategies presented in the Goal and Strategies chapter will improve bicycle access, but according to nationwide best practices and Bay Area experience, if BART is serious about achieving the goal of this plan there are essential facilities to install and policies to implement.

How effective is the strategy at encouraging bicycle use?

A second criterion used to select the strategies BART should implement is separating those expected to increase bicycle access from those that merely facilitate it. In other words, will the strategy encourage drive-access passengers to try biking to BART or attract new passengers to the system, or purely make biking to BART more pleasant for those already doing so? The

satisfaction of existing customers is tracked closely by and is extremely important to BART, but this criterion acknowledges that, to double the system's bicycle access rate, we need to attract new bike access passengers.

How easy is the strategy to implement?

Another important consideration when selecting the highest priority strategies for BART to pursue is ease of implementation. The agency should select a mix of strategies, ensuring that some can be carried out soon after adoption of this plan, even as others are in the planning stage.

How expensive is the strategy?

The true cost of an investment cannot be known until any avoided costs are calculated. For instance, an attended bike station may have higher operational costs than other types of bicycle parking, but if it lures more passengers out of their cars, it may have a lower net cost to the system. Nonetheless, project cost is especially relevant in a time of diminished resources, when BART will need to rely on grants for many bicycle-related improvements.

Will the strategy also benefit other BART passengers?

Some improvements to BART stations that encourage and highlight bicycle access also help other passengers, particularly those with mobility challenges. Having this added benefit is another criterion that was used to prioritize the strategies presented in this chapter.

Recommendations

The strategies recommended in this chapter are the subset of those presented in the Goal & Strategies chapter that are expected to best help achieve the goal of doubling bicycle access to BART stations by 2022. For more details on each of the five objective categories, as well as the strategies themselves, please refer to the Goal & Strategies chapter, which presents more comprehensive descriptions. The write-ups in this chapter focus on how and why it is recommended that BART staff focus on carrying out these particular strategies.

Recommended strategies

❶ Cyclist Circulation

1.1 Develop and install wayfinding signage
1.2 Optimize routes between surrounding network and fare gates
1.3 Evaluate and install stairway channels
1.4 Revisit bicycles on escalators policy
1.5 Clean elevators regularly

❷ Plentiful Parking

2.1 Provide adequate bicycle parking of each type
2.2 Light all bicycle parking areas
2.3 Maintain bicycle facilities more frequently
2.4 Allow Clipper payment for bicycle parking

❸ Beyond BART Boundaries

3.1 Evaluate and implement bicycle sharing at BART stations
3.2 Support local efforts to improve bicycle access to stations
3.3 Create station area maps with recommended bike routes

❹ Bikes on BART

4.1 Provide space for bicycles in new BART cars
4.2 Evaluate blackout periods

❺ Persuasive Programs

5.1 Educate passengers and staff on use and benefits of bicycles
5.2 Improve communications with customers on BART bicycle policies and facilities
5.3 Collect access mode data before/after bicycle improvements
5.4 Evaluate and increase automobile parking fees
5.5 Participate in more Bike-to-Work day events
5.6 Fight bicycle theft

❶ Cyclist Circulation

1.1 | Develop and install wayfinding signage

A coordinated system of bold, clear directional signs aimed at cyclists within the BART system would simultaneously communicate the importance of bicycles in BART's access mode hierarchy; draw attention to each station's bicycle parking facilities, accessible fare gates and, where appropriate, stairway channels and other facilities designed to promote bicycle access to the system; and suggests to other passengers the convenience of accessing the station in an alternative way. BART should coordinate bicycle wayfinding with MTC's Hub program, as well as with its own ongoing efforts to create a unique, branded program, such as at the Ashby and downtown San Francisco stations.

1.2 | Optimize routes between surrounding network and fare gates

Once cyclists reach a BART station, their journey to the fare gates is not over. Retrofitting parking lots with dedicated bike lanes and, as needed, sidewalks with parallel pathways, will help separate motor vehicles and pedestrians from bikes, while, like wayfinding signs, communicating to all passengers that bicycling is a safe, alternative way to reach BART. In addition to retrofitting stations, BART should incorporate direct and safe bicycle routes into station planning efforts.

1.3 | Evaluate and install stairway channels

BART's design as a subway and above-ground system means passengers have to change levels in order to reach trains at all stations. Stairways, escalators and elevators are provided for these transitions, but none are ideal for nor serve to welcome passengers with bikes. Bicycles are currently prohibited on the system's escalators (see Strategy 1.4) and elevators can be slow and are better prioritized for passengers who don't have an option, such as those using a wheelchair or pushing a stroller. Since many passengers find it difficult to carry bicycles on stairways, BART has installed a limited number of "stairway channels," mini-ramps that parallel stairways, thus allowing cyclists to roll their bikes as they walk up or down stairs (see Existing Conditions chapter). Although costly to retrofit onto existing stairways, channels can reduce these barriers while sending a message that BART welcomes cyclists at every step of their journey. To implement this strategy, BART should evaluate the stairway channels at the 16th Street station and, depending on the findings, create design standards for stairway channels and criteria to determine which stairways in the system should be retrofitted first.

> *Retrofitting parking lots with dedicated bike lanes and, as needed, sidewalks with parallel pathways, will help separate motor vehicles and pedestrians from bikes, while communicating to all passengers that bicycling is a safe way to reach BART.*

1.4 | Revisit bicycles on escalators policy

At the behest of passengers who find carrying their bicycles on escalators to be the easiest option for moving vertically, BART staff has re-examined the agency's long-standing prohibition of bicycles on escalators. Although staff has concluded that the ban should not be lifted due to safety and liability concerns (see Existing Conditions chapter), this policy deserves review because of the high cost of stairway channels, the inconvenience and unpleasantness of some BART elevators and the perceived unfairness of banning bikes on escalators, but not other large items, such as luggage. BART's study should evaluate the effectiveness and enforcement of the prohibition, investigate transit systems internationally that permit bikes on escalators, and evaluate if there are safety differences between carrying a bicycle, versus resting one, on an escalator.

1.5 | Clean elevators regularly

Although BART maintenance crews clean station elevators more frequently than in the past, actual and perceived filth and stench are major barriers to using them. Regularly cleaning and monitoring elevators would help discourage passengers with bicycles, strollers and luggage from using escalators (see Strategy 1.4) and greatly improve the BART experience for passengers with disabilities who are unable to use stairways or escalators.

❷ Plentiful Parking

2.1 | Provide adequate bicycle parking of each type

Bicycle parking that passengers can depend on to be available, secure and sheltered from weather, is arguably the most effective way to increase bike access to BART. Well-designed, -sited and -maintained bicycle parking communicates to all BART passengers that bikes are an essential part of the BART system. The Bicycle Investment Tool developed in conjunction with this plan and described in the previous chapter will help BART staff determine the optimal amount and type of parking at each station. Parking should be placed inside the fare gates, visible to the station agent or adjacent to main paths of travel wherever possible.

2.2 | Light all bicycle parking areas

Adequate lighting in bicycle parking areas increases the security of passengers and their bicycles, while casting light on adjacent walkways, which benefits all passengers. BART should include appropriate lighting levels when planning and constructing bike parking.

> *Bicycle parking that passengers can depend on to be available, secure and sheltered from weather, is arguably the most effective way to increase bike access to BART.*

2.3 | Maintain bicycle facilities more frequently

Bicycle parking facilities don't engender confidence if they're populated with vandalized bikes or are otherwise in poor repair. As a complement to Strategy 2.1, BART should immediately remove clearly vandalized bikes and regularly maintain bicycle parking facilities, both those indoors and those exposed to the elements. This effort will communicate to passengers, as well as thieves, that BART is paying attention to theft. Frequent removal – at least quarterly – will also maximize available bicycle parking at each station. A corollary to this strategy is to identify which "abandoned" locks were intentionally left by regular BART passengers in order to avoid carrying these heavy items home at night, then back in the morning. This practice should be discouraged by BART, as these locks are a sign of bike theft to other passengers.

2.4 | Allow Clipper payment for bicycle parking

At present, passengers must obtain a BikeLink card in order to use eLockers and automated bike stations. Retrofitting these electronic devices to accept Clipper card payment would remove one barrier to parking a bike at BART, while making bicycle access more inviting to passengers who may consider trying this mode. The first step toward implementing this strategy is to assess the feasibility and compatibility of Clipper card payment with existing and future bike parking, and to develop a retrofitting program and timeline.

> *Bike-sharing is especially well-suited to expand the reach of public transit systems is coming to the Bay Area in fall 2012, including to all downtown San Francisco BART stations.*

❸ Beyond BART Boundaries

3.1 | Evaluate and implement bicycle sharing at BART stations

Bicycle-sharing is a system of short-term automated bicycle rental stations at which users can rent a bike and return it at another bike share location. This arrangement – which is especially well-suited to expand the reach of public transit systems – is underway in many cities throughout the world, and is coming to the Bay Area in fall 2012, including to all downtown San Francisco BART stations. Bike sharing appeals to passengers who want to experiment with biking to BART, and to those whose destinations are just beyond walking distance of a station. Bike sharing eliminates the challenges of moving vertically through stations and boarding trains with a bicycle. BART should collaborate with local agencies and

private partners to evaluate the new bike sharing system, with an eye towards expanding elsewhere in the BART system.

3.2 | Support local efforts to improve bicycle access to stations

Without safe bikeways, clear wayfinding signage and adequate safe parking, no level of bicycle-related improvements BART makes will significantly increase the number of passengers who bike to BART stations. This perspective is increasingly recognized at the local, countywide and regional levels, most notably through the One Bay Area effort. BART Planning and Community & Government Relations staff should continue to ensure that BART is at the table developing such programs, particularly those aimed at reducing driving to stations. Although BART does not have control over improvements outside of BART property, adequate Customer Access staff should be hired and deployed to support local agencies in their efforts to fund and implement bicycle facilities near BART stations with letters of support and participation in local meetings. Funding a wayfinding sign program that produces and distributes to local governments unique signs that direct passengers with bicycles (and those without) to stations would help riders find preferred bicycle routes, and publicize the bike access option. Working with private developers to incorporate bicycle facilities into adjacent and nearby development will be an increasingly important way to improve bicycle access to BART stations. Another opportunity is the East Bay Greenway, a planned bicycle and pedestrian trail that will link five BART stations in Alameda County (see Goal & Strategies chapter). Appendix F provides a list of many other projects included in local plans, while Appendix D contains additional improvements suggested by countywide advocacy groups and bicycle/pedestrian advisory committee members.

3.3 | Create station area maps with recommended bike routes

For BART passengers unfamiliar with bikeways from their destination station to the nearby bicycle network, major destinations and bicycle shops, as well as potential passengers who now avoid BART because their destinations are beyond walking distance of a station, maps of station areas that show local bicycle route information up to a radius of three mile or so would increase ridership and bike access rates. BART should work with MTC staff to assure consistent route recommendations with MTC's BikeMapper online tool. This information should be posted on all station area and destination maps, as well as printed on bicycle-specific maps to be distributed pocket-sized and posted on the agency website. The reverse side should include information on BART bicycle programs and policies (see Strategies 5.1 and 5.2).

4 Bikes on BART

4.1 | Provide space for bicycles in new BART cars

Although this plan recommends that BART do all it can to encourage passengers who don't need their bicycle at the destination end of their trip to feel confident parking at their origin or destination station, there will always be passengers who need to take their bicycle onboard. Bicycle-priority areas on trains communicate that cyclists are welcome, while preventing bicycles from interfering with other passengers. BART should refine the design of trial bicycle-priority areas, folding seats and stabilizing features on the train cars scheduled for service in 2017. BART should also consider special bicycle-priority cars with more of these features than other cars.

> *Bicycle-priority areas on trains communicate that cyclists are welcome, while preventing bicycles from interfering with other passengers.*

4.2 | Evaluate blackout periods

Due to crowding, passengers are not permitted to bring their bicycles aboard trains during the commute period in the commute direction[16]. These times, because they are designated on a train-by-train basis, vary by station and are therefore difficult for cyclists, train operators, station agents BART police and other passengers to remember and understand. Consistent, systemwide blackout periods, as are in effect at many other transit agencies, would make it easier to know when bicycles are allowed on BART, but would also reduce onboard bike access at any given station. BART should evaluate the blackout periods station-by-station to determine if there is a way to make the blackout hours more consistent without significantly reducing onboard access. Regardless of if this exercise results in adjusted periods, clearly communicating blackout times will make trip planning easier for cyclists and enforcement easier for BART staff, while reducing potential conflicts during blackout periods.

5 Persuasive Programs

5.1 | Educate passengers and staff on use and benefits of bicycles

One of the easiest barriers to overcome to increase bicycle access to BART is ignorance. Many passengers just don't know the best bike routes to their station, where and how to safely lock a bike or the rules surrounding bringing a bicycle onboard trains. Educating passengers on the use of BART's bicycle facilities can increase bicycle access, cyclist confidence and bike security in a number of ways. A public information campaign on how "bikes benefit everyone" can attract new cyclists and send a positive message to all BART passengers about bicycling. A targeted healthy station access program, perhaps partnering with Kaiser Permanente and/or countywide bicycle coalitions, could help promote the health benefits of riding to BART. A separate campaign to encourage BART staff to access BART by bike will give the system first-hand insight into how to improve bicycle access to BART.

5.2 | Improve communications with customers on BART bicycle policies and facilities

The ways in which messages about bicycle access are communicated are often as important as the messages themselves. Therefore, it is recommended that BART focus on this critical aspect of Strategy 5.1 as a separate strategy. Using positive language, posting information at appropriate decision-making points, and communicating all BART policies that affect bicycles through multiple media will make it easier for all passengers to learn and follow the rules. Many BART riders do not know about lockers and Bike stations and how to use them—this is also important to communicate.

> *Ironically, one of the biggest determiners of bicycle access rates at a given BART station is the availability of free auto parking at that station.*

5.3 | Collect access mode data before/after bicycle improvements

One way in which bicycle access to BART is at a competitive disadvantage compared to other modes, particularly the automobile, is the shortage of information correlating bike-related investments to increased bicycle access and ridership figures. Better collection of bike access data before and after bicycle parking and other related improvements, and including more bike-related questions in systemwide surveys will put these sorts of investments on a more equal footing with other station improvements. Building the evaluation component of investments into the planned capital expenditure is another good way to guarantee funding for before/after assessments. Conducting the Station Profile Study more frequently than once per decade will also generate robust data with which to track investment performance and guide future investments. Coordinating with MTC's annual intersection count program to obtain access counts at specific stations is another potential source of useful data.

[16] In the off-peak period, when bicycles are allowed on trains, BART minimizes the number of cars on each train. Although this can result in crowded trains, this decision reflects the high cost of operating additional cars in terms of wear and tear on all vehicles in operation.

5.4 | Evaluate and increase automobile parking fees

Ironically, one of the biggest determiners of bicycle access rates at a given BART station is the availability of free auto parking at that station (see Existing Conditions chapter for evidence of the strong relationship between parking fees and bike access). Charging market-rate parking fees at all BART stations, while providing excellent bike parking options, would likely allow BART to achieve the goal of doubling bicycle access by 2022 faster than any other strategy. Targeting a portion of the increased revenue to bicycle access improvements and evaluation is one logical source of revenue to pay for them. Related, in the process of constructing new development on BART parking lots, the agency should evaluate how much lost automobile parking could be replaced with bicycle parking.

5.5 | Participate in more Bike-to-Work day events

For many commutes, combining bicycling and BART creates the best competition to driving to work. BART currently provides space at some stations for annual Bike-to-Work day events, but it is recommended that the agency more actively participate by staffing booths and providing special incentives to try regularly biking to BART.

5.6 | Fight bicycle theft

Building plentiful, secure bike parking will go a long way toward protecting BART passengers' bicycles. Beyond this infrastructure, tracking theft data more closely, and encouraging passengers to report incidents of theft will help BART staff get a better handle on trends and hot spots. Specific measures include improved reporting forms and databases, so that how and where stolen bikes were locked can be tracked; regular review of security videos; and better communication between BART police, bicycle planning staff and BART's Bicycle Accessibility Task Force. These recommended actions will help BART target sting operations, parking investments, safety campaigns and other theft prevention efforts. Educating riders on proper locking technique and recording and storing their bicycle's serial number will also help fight bicycle theft,

Next Steps

The 20 recommendations in this chapter have the power to transform BART from a transit system that accommodates bicycles to one that depends on them. These strategies are prioritized based on their importance to a bike-friendly system, effectiveness in attracting new cyclists, ease of implementation, cost and benefits to other passengers. For all strategies, BART will need to continue, and expand, the commitment of funding and staff to improving bicycle access. Approaches to systemwide improvements will differ from those that focus on station-specific enhancements.

Systemwide Bicycle Access Coordination

Systemwide recommendations include policies regarding blackout periods, train car design and public campaigns to make the system more welcoming of cyclists. Some, but not all, of these strategies are part of larger, more comprehensive programs, such as wayfinding signage and rail car design. The BART Bicycle Accessibility Task Force (BBATF) is a volunteer committee of BART customers who meet regularly with BART staff with a mutual goal of improving bicycle access to the system and its stations. The Task Force will have valuable input on many, if not all, systemwide strategies recommended in this plan. Many systemwide recommendations may also require additional staff coordination, such as reviews of blackout periods and the escalator policy.

Station-specific Investments

Many strategies recommended in this chapter will make sense only at certain stations, either because they've already been implemented at some or because other investments would be more valuable in a particular station context. To determine the best use of staff time in terms of focusing on the strategies that

will encourage the most new bicycle access at a given station, BART staff must use their judgment and the Bicycle Investment Tool to develop ideal station-by-station investment plans that consider the unique needs of and opportunities at each. This exercise will reveal instances where it may make sense to coordinate with other BART efforts, as well as investments that would be best implemented at multiple stations simultaneously.

Funding

Although BART funds can be used for some recommended strategies, many will need support from outside sources. Appendix I provides a checklist of potential local, regional, state and federal funding programs and the type of projects each typically supports. In addition, as suggested in Strategy 3.2, BART staff can help local efforts to improve the bikeways that serve BART stations identified in Appendix F by writing letters and speaking at important public meetings.

Bicycle Investment Tool Updates

The Bicycle Investment Tool developed in conjunction with this Bicycle Plan is one of the first attempts anywhere to estimate and predict the effect of various strategies on bicycle access to transit. Due to limitations on the quantity and quality of data available for model development, there is much room for improvement to this pioneering effort (see Strategy 5.3). BART (and other transit operators) can improve the future performance of the tool through the following data collection efforts:

- **Survey data:** Future versions of the tool would benefit from more detailed bicycle-related data from the BART Station Profile and Customer Satisfaction surveys, including increasing the sample size, adding more bicycle related questions such as the ones included in the 2011 online BART Bicycle Access Survey, and augmenting existing survey questions by adding more bike-related response options.

- **Observed use data:** Detailed collection of bicycle infrastructure data at each station, including levels of use, would also add to the reservoir of information on which an improved spreadsheet tool will rely.